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AD-A231 690

INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 2

DULUTH INTERNATIONAL AIRPORT
DULUTH, MINNESOTA 55811

DAMES & MOORE
1550 NORTHWEST HIGHWAY
PARK RIDGE, ILLINOIS 60068

MAY 26, 1988

APPENDIX (28 OCTOBER 1986 TO 13 JANUARY 1987)

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

PREPARED FOR
AIR NATIONAL GUARD
ANDREWS AFB, MD 20331-6008

UNITED STATES AIR FORCE
OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY (USAFOEHL)
TECHNICAL SERVICES DIVISION (TS)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

91 2 11 077

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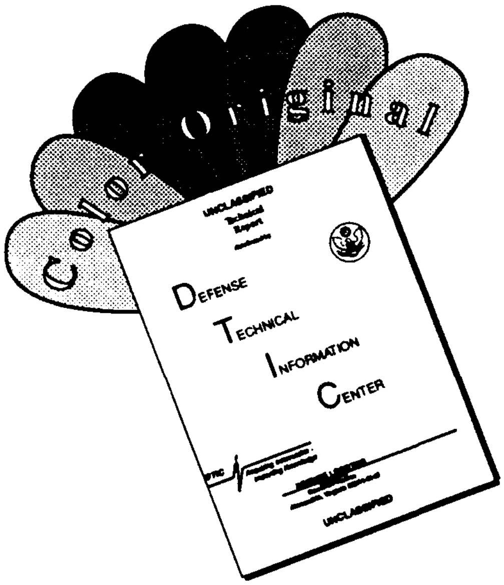

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REPORT DOCUMENTATION PAGE

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OMB No. 0704-0188

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2. REPORT DATE
26 May 1988

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Final Phase II Confirmation/Quantification

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Phase II-Confirmation/Quantification
Stage 2
Duluth International Airport
Duluth, Minnesota 55811

5. FUNDING NUMBERS

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Dames and Moore
1550 Northwest Highway
Park Ridge, Illinois 60068

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Air National Guard
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Approved for public release;
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13. ABSTRACT *(Maximum 200 words)*

Phase II - Confirmation/Quantification Stage 2 report on hazardous waste sites idendified in the Phase I report on the Duluth International Airport. Sites were analyzed for contaminated soils and groundwater. The data was used to evaluate to human health risk and the potential for future contamination.

Information obtained from sampling is listed in data tables. This data includes pesticides, chemicals and other contaminants found at the site. Decontomination techniques are discussed.

14. SUBJECT TERMS
Installation Restoration Program
Phase II - Confirmation/Quantification Stage 2
Minnesota Air National Guard

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298-102

A

LIST OF APPENDICES

APPENDIX A

DEFINITIONS, NOMENCLATURE, AND UNITS OF MEASUREMENT

ANG	Air National Guard
ASTM	American Society for Testing and Materials
Aquifer	zone beneath the earth's surface capable of producing water for a well.
BGS	Below Ground Surface
BOG	A waterlogged area of land, covered by spongy groundmass containing acidic, decaying vegetation which may develop into peat.
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980
cm/s	centimeters per second
DDD	pesticide compound syn: 1,dichloroethane or TDE. Similar to DDT.
DEQPPM	Defense Environmental Quality Program Policy Memorandum
Deranged Drainage	a distinctively disordered drainage pattern in a recently glaciated area whose former surface and preglacial drainage has been remodeled and effaced, and in which the new drainage system shows a complete lack of underlying structural and bedrock control. It is characterized by irregular streams that flow in and out of lakes, by only a few short tributaries, and by swampy interstream areas.
DPDO	Defense Property Disposal Office
DoD	Department of Defense
Duluth IAP	Duluth International Airport
ground water divide	a line on the water table on each side of which the ground water table slopes away from the line.
ground water surface	the level below which the earth is saturated.
GABBRO	a group of dark-colored, basic intrusive igneous rocks.

HARM	Hazard Assessment Rating Methodology. A numerical scoring system used to evaluate potentially contaminated sites. The system takes into account site and waste characteristics, pathways of migration, and potential receptors of contamination. The HARM system is used to indicate the relative need for follow-up action.
hydraulic gradient	change in pressure or head in the ground water over a given distance of flow
Intrusive Igneous Rocks	Rock of molten origin that has been injected into existing rock and solidified without reaching the ground surface.
IRP	Installation Restoration Program
Kame	a steep-sided hill or ridge, composed chiefly of poorly sorted and stratified sand and gravel deposited by a subglacial stream as a delta against or upon the terminal margin of a melting glacier.
Lopolith	a large, lens-shaped igneous intrusion.
Marsh	a water-saturated, poorly drained area, intermittently or permanently water-covered, having aquatic and grasslike vegetation, essentially without peatlike accumulation.
ug/l	micrograms per liter (equivalent to parts per billion in water).
umho/cm	micromhos per centimeter (units of Specific Conductance).
ug/g	Micrograms per gram (equivalent to parts per million in water).
ug/kg	Micrograms per kilogram (equivalent to parts per billion in water).
mg/l	milligrams per liter (equivalent to parts per million in water).
mgd	million gallons per day

Moraine	a distinct accumulation of unsorted, unstratified glacial drift, predominantly till, deposited chiefly by direct action of glacier ice.
MSL	Mean Sea Level Datum
Outwash	stratified sand and gravel removed from a glacier by meltwater streams.
pH	negative logarithm of the hydrogen ion concentration in water.
PCB	Polychlorinated Biphenyls
ppb	parts per billion (equivalent to ug/l in water).
ppm	parts per million (equivalent to mg/l in water).
Syncline	a fold in layers of rock that is concave upward.
Swamp	a water-saturated area, intermittently or permanently covered with water, having shrub- and tree-type vegetation, essentially without peatlike accumulation.
TOC	Total Organic Carbon
TOX	Total Organic Halogens, which are organic compounds containing any of the elements of Group VII-b of the Periodic Table (F, Cl, Br, I).
Unconsolidated Sediments	sediments that are uncemented and thus contain interconnected void space (primary porosity) that allow for the storage and transmission of ground water.
USAF	United States Air Force
USAF/OEHL	Occupational and Environmental Health Laboratory
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOA	Volatile Organic Compounds

APPENDIX B

STATEMENT OF WORK

CONTRACTOR'S COPY

REF 55X 55X

ORDER FOR SUPPLIES OR SERVICES

1. PAGE 1 OF 28

2. PROC INSTRUMENT ID NO. (PIIN)	3. CALL/ORDER NO.	4. DATE OF ORDER*	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. CERTIFIED FOR NATIONAL DEFENSE UNDER
F33615-83-D-4002	0038	86SEP26	FY7624-86-01014	DO-S1

Mark all packages & papers with this number.

DOC REG 2/DMS REG 1 RATING

7. ISSUED BY CODE FQ8419
DEPARTMENT OF THE AIR FORCE
AIR FORCE SYSTEMS COMMAND
AERONAUTICAL SYSTEMS DIV/PMRSC
WRIGHT-PATTERSON AFB OH 45433-6503
CONTRACT NEGOTIATOR:
GLENNITH C. JOHNSON
PHONE: (513)-255-3042

8. ADMINISTERED BY CODE S1403A
DCASMA CHICAGO
O'HARE INTERNATIONAL AIRPORT
P.O. BOX 66911
CHICAGO IL 60666-0911

9. CONTRACTOR NAME AND ADDRESS CODE 1S346 FACILITY CODE
IF "S" FOR MULTIPLE FACILITIES SEE SECT "G"
DAMES & MOORE
1550 NORTHWEST HIGHWAY
PARK RIDGE IL 60068

PHONE: (312)-297-6120
COUNTY: COOK

MAILING DATE

SEP 30 1986

DUPLICATE ORIGINAL

10. MAIL INVOICES TO

11. DISCOUNT FOR PROMPT PAYMENT
1ST N % DAYS NET DAYS
2ND % DAYS OTHER IF "S" SEE SECT "B"
3RD % DAYS

12A. PURCHASE OFFICE POINT OF CONTACT
LRX/L72/LRX

12B. RESERVED FOR SERVICE/AGENCY USE

13. PAYMENT WILL BE MADE BY CODE S1402A IF "S" SEE SECT "G"
DCASR CHICAGO
O'HARE INTERNATIONAL AIRPORT
P.O. BOX 66475
CHICAGO IL 60666-0475

14. TYPE CONTRACTOR: A
15. SECURITY A. CLAS: U B. DATE OF DD 254

16. CONTRACT ADMINISTRATION DATA
A. FAST PAY B. CONTRACT (1) KIND 0 (2) TYPE 9 C. ABSTRACT RECIP ADP POINT D. SPL CONT PROVISIONS E. CONT ADMIN FUNC LMT
17. (RESERVED)
18. SVC/AGENCY USE
19. SURV CRIT: C
20. TOTAL AMOUNT: NOT-TO-EXCEED $ 445,020.00

21. APPROPRIATION AND ACCOUNTING DATA
A. ACCTY CLASS: U B. ACRN: AA C. APPROPRIATION: 5763400 D. LIMIT SUBHEAD
E. SUPPLEMENTAL ACCOUNTING CLASSIFICATION: 306 4740 5H4499 F00807 59200 000000 528500
F. CPN RECIPIENT DODAAD: F28500 G. OBLIGATION AMOUNT: $445,020.00 H. NON-CLIN/ELIN PAYMENT PROV I. SVC AGENCY USE: FY7624-86-01014

22A. TYPE OF ORDER
DELIVERY X
B. NON-DOD CONTRACT NO.
This delivery order is subject to instructions contained on this side of form only and is issued in accordance with and subject to terms and conditions of above numbered contract, or Non-DOD Contract No.

PURCHASE
Reference your ___
Furnish the following on terms specified herein, including, for U.S. purchases, General Provisions of Purchase Order on DD form 1155 (EXCEPT CLAUSE NO. 12 APPLIES ONLY IF THIS BOX IS CHECKED, AND NO. 15 IF THIS BOX IS CHECKED), special provisions ___ and delivery as indicated. This purchase is negotiated under authority of 10 USC 2304(a)( ) or as specified in the schedule if within the U.S., its possessions or Puerto Rico; if otherwise, under 2304(a)(6).
If checked, Additional General Provisions apply, supplier shall sign Acceptance on DD form 1155, and return ___ copies.

*If quantity accepted by the Government is same as quantity ordered, indicated by ✓ mark. If different enter actual quantity accepted below quantity ordered and encircle.

23. UNITED STATES OF AMERICA
Howard E. Marks Jr. 9/26/86
HOWARD E. MARKS JR. (YYMMDD)
BY. NAME OF CONTRACTING/ORDERING OFFICER AND DATE

24. TOTAL
28. DIFFERENCES

25. QUANTITY ORDERED HAS BEEN ☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS STATED
DATE SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

26. SHIP NO. ☐ PARTIAL ☐ FINAL
27. D.O. VOUCHER NO.
29. INITIALS
30. PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL
31. PAID BY
32. Amount Verified Correct For
33. CHECK NUMBER
34. BILL OF LADING NO.

35. I CERTIFY THIS AMOUNT IS CORRECT AND PROPER FOR PAYMENT
SIGNATURE AND TITLE OF CERTIFYING OFFICER

36. RECEIVED AT	37. RECEIVED BY	38. DATE RECEIVED	39. TOTAL CONTAINERS	40. S/R ACCOUNT NUMBER	41. S/R VOUCHER NO.

PREVIOUS EDITION IS OBSOLETE.

AFSC FORM 700 AUG 80

*When used as a formal contract this will be the effective date.

AFSC—Andrews AFB Md 1980

PART I SECTION B OF THE SCHEDULE
SUPPLIES LINE ITEM DATA

1. PROC INSTRUMENT ID NO. (PIIN) F33615-83-D-4002 | 2. SPIIN 0038 | 3. PAGE 2 OF 28

4. ITEM NO.	5. QUANTITY*	6. PURCH UNIT	7. UNIT PRICE	8. TOTAL ITEM AMOUNT*
0001	1	SE	$N	$N

9. SCTY CLAS	10. ACRN	11. NSN	12. FSCM AND PART NUMBER	13. CIRR
U	AA	N		

14. SITE CODES A. POA	B. ACP	C. FOB	15. NOUN	16. SVC/AGENCY USE
D	D	D	AIR SAMPLING, ANALYSIS, AND DATA	

17. PR/MIPR DATA	18. AUTHORIZED RATE A. PROGRESS PAY	B. RECOUP	19. CONTRACT PERCENT FEE	20. SVC ID NO.	21. ITEM/PROJ MGR
FY7624-86-01014	%	%	%		FY7624

22. 1ST DISCOUNT A.	B. DAYS	23. 2ND DISCOUNT A.	B. DAYS	24. 3RD DISCOUNT A.	B. DAYS	25. NET DAYS	26. QUANTITY VARIANCE A. OVER	B. UNDER	27. TYPE CONTRACT	28. OPR
%		%		%			%	%	Y	

29. DESCRIPTIVE DATA

CONDUCT WORK IAW THE TASK DESCRIPTION OF THIS ORDER AND SECTION C, THE DESCRIPTION/SPECIFICATIONS OF THE BASIC CONTRACT. SUBMIT DATA IAW ATTACHMENT# 1 , THE CONTRACT DATA REQUIREMENTS LIST OF THE BASIC CONTRACT, AS IMPLEMENTED BY PARAGRAPH VI OF THE TASK DESCRIPTION.

4. ITEM NO.	5. QUANTITY*	6. PURCH UNIT	7. UNIT PRICE	8. TOTAL ITEM AMOUNT*
0002	1	SE	$N	$N

9. SCTY CLAS	10. ACRN	11. NSN	12. FSCM AND PART NUMBER	13. CIRR
U	AA	N		

14. SITE CODES A. POA	B. ACP	C. FOB	15. NOUN	16. SVC/AGENCY USE
D	D	D	SUPPORT (0001)	

17. PR/MIPR DATA	18. AUTHORIZED RATE A. PROGRESS PAY	B. RECOUP	19. CONTRACT PERCENT FEE	20. SVC ID NO.	21. ITEM/PROJ MGR
FY7624-86-01014	%	%	%		FY7624

22. 1ST DISCOUNT A.	B. DAYS	23. 2ND DISCOUNT A.	B. DAYS	24. 3RD DISCOUNT A.	B. DAYS	25. NET DAYS	26. QUANTITY VARIANCE A. OVER	B. UNDER	27. TYPE CONTRACT	28. OPR
%		%		%			%	%	Y	

29. DESCRIPTIVE DATA

PROVIDE SUPPORT IN ACCORDANCE WITH THE TASK DESCRIPTION OF THIS ORDER AND SECTION C, THE DESCRIPTION/SPECIFICATIONS OF THE BASIC CONTRACT.

*REPRESENTS NET AMOUNT OF INCREASE/DECREASE WHEN MODIFYING EXISTING ITEM NO.

N = NOT APPLICABLE
U = UNDEFINITIZED
NSP = NOT SEPARATELY PRICED

E = ESTIMATED
− (IN QTY AND $) = DECREASE
+ OR − (IN ITEM NO.) = ADDITION OR DELETION
CIRR: CONTROLLED ITEM RPT RQMT

SITE CODES: S = SOURCE, D = DESTINATION, O = INTERMEDIATE

AFSC FORM 705 JAN 80 — PREVIOUS EDITION WILL BE USED. — AFSC—Andrews AFB Md 1980

PART I SECTION B OF THE SCHEDULE
SUPPLIES LINE ITEM DATA

1. PROC INSTRUMENT ID NO. (PIIN): F33615-83-D-4002
2. SPIIN: 0038
3. PAGE 3 OF 28

4. ITEM NO.	5. QUANTITY*	6. PURCH UNIT	7. UNIT PRICE	8. TOTAL ITEM AMOUNT*
0004	1	SE	$N	$N

9. SCTY CLAS	10. ACRN	11. NSN	12. FSCM AND PART NUMBER	13. CIRR
U	AA	N		

14. SITE CODES A. PQA	B. ACP	C. FOB	15. NOUN	16. SVC/AGENCY USE
D	D	D	CHEM/PHYS ANALYSIS AND DATA	

17. PR/MIPR DATA	18. AUTHORIZED RATE A. PROGRESS PAY	B. RECOUP	19. CONTRACT PERCENT FEE	20. SVC ID NO.	21. ITEM/PROJ MGR
FY7624-86-01014	%	%	%		FY7624

22. 1ST DISCOUNT A.	B. DAYS	23. 2ND DISCOUNT A.	B. DAYS	24. 3RD DISCOUNT A.	B. DAYS	25. NET DAYS	26. QUANTITY VARIANCE A. OVER	B. UNDER	27. TYPE CONTRACT	28. OPR
%		%		%			%	%	J	

29. DESCRIPTIVE DATA

PERFORM CHEMICAL TESTS IAW THE TASK DESCRIPTION OF THIS ORDER AND SECTION C, THE DESCRIPTION/SPECIFICATIONS OF THE BASIC CONTRACT. SUBMIT DATA IAW ATTACHMENT# 1 , THE CONTRACT DATA REQUIREMENTS LIST OF THE BASIC CONTRACT, AS IMPLEMENTED BY PARAGRAPH VI OF THE TASK DESCRIPTION.

4. ITEM NO.	5. QUANTITY*	6. PURCH UNIT	7. UNIT PRICE	8. TOTAL ITEM AMOUNT*
			$	$

9. SCTY CLAS	10. ACRN	11. NSN	12. FSCM AND PART NUMBER	13. CIRR

14. SITE CODES A. PQA	B. ACP	C. FOB	15. NOUN	16. SVC/AGENCY USE

17. PR/MIPR DATA	18. AUTHORIZED RATE A. PROGRESS PAY	B. RECOUP	19. CONTRACT PERCENT FEE	20. SVC ID NO.	21. ITEM/PROJ MGR
	%	%	%		

1ST DISCOUNT A.	B. DAYS	23. 2ND DISCOUNT A.	B. DAYS	24. 3RD DISCOUNT A.	B. DAYS	25. NET DAYS	26. QUANTITY VARIANCE A. OVER	B. UNDER	27. TYPE CONTRACT	28. OPR
%		%		%			%	%		

29. DESCRIPTIVE DATA

*REPRESENTS NET AMOUNT OF INCREASE/DECREASE WHEN MODIFYING EXISTING ITEM NO.

N = NOT APPLICABLE
U = UNDEFINITIZED
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E = ESTIMATED
− (IN QTY AND $) = DECREASE
+ OR − (IN ITEM NO.) = ADDITION OR DELETION
CIRR: CONTROLLED ITEM RPT RQMT

SITE CODES: S = SOURCE, D = DESTINATION, O = INTERMEDIATE

AFSC FORM 705 JAN 80 PREVIOUS EDITION WILL BE USED

I. DESCRIPTION OF WORK

The objective of IRP Phase II investigations is to identify contaminants and then define the magnitude, extent, direction and rate of movement of identified contaminants. A series of staged field studies may be required to meet this objective.

The Phase II Stage 2 effort at Duluth IAP will entail a follow-on investigation for five sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites which are included in this study are identified in Table 1 and can be located on an installation map, Figure 1. The sites to receive follow-on investigative work are Goose Dump 1, Fire Training Areas, DPDO Storage Area "C" and the Tank Farm Area.

The purpose of this effort at Duluth IAP is to: (1) confirm the presence - absence of contamination within the specifed areas of investigation; (2) .. contamination exists, determine the magnitude of contamination, and the potential for and rate of migration of those contaminants in the various environmental media; (3) identify potential environmental and health risk consequences of migrating pollutants; and (4) recommend additional investigations necessary to further define the magnitude, extent, direction and rate of contaminant migration.

The Phase I and the Phase II Stage 1 IRP Reports (mailed under separate cover) incorporate the background and description of the sites included in this task. To accomplish this survey effort, take the following actions:

A. General

1. Monitor all borehole and well drilling with a photoionization meter or equivalent organic vapor detector to identify the potential generation of hazardous and/or toxic vapors or gases. Include air monitoring results in the boring logs. If soil encountered during drilling or test pit work is suspected to be hazardous because of discoloration, odor or air monitoring, containerize the soil cuttings in new, unused drums. Enter into the boring logs the depth(s) from which suspected contaminated soil cuttings were collected. Test each drum containing suspected contaminated soils by taking a composite sample. Collect a maximum of 15 composite samples and test them for EP Toxicity and Ignitibility. (Ref: 40 CFR Subpart C., 261.21 - Ignitibility and 261.24 - EP Toxicity).

2. Determine the exact field location of all boreholes and monitor wells during the planning/mobilization phase of the field investigation. Consult with base personnel to minimize disruption of base activities, to properly position boreholes with respect to exact locations of spill/leak sites, and to avoid underground utilities. The senior on-site contract representative, in consultation with the USAF OEHL project manager and the base point-of-contact (see Section V), establishes the final borehole and well locations. Direct all drilling and sampling operations and maintain a detailed log of the conditions and materials penetrated during the course of the work.

TABLE 1

LISTING OF SITES

SITE NO.	PHASE I NO.	SITE DESCRIPTION
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

NOTE: ANG: Air National Guard sites
TAC: Tactical Air Command sites

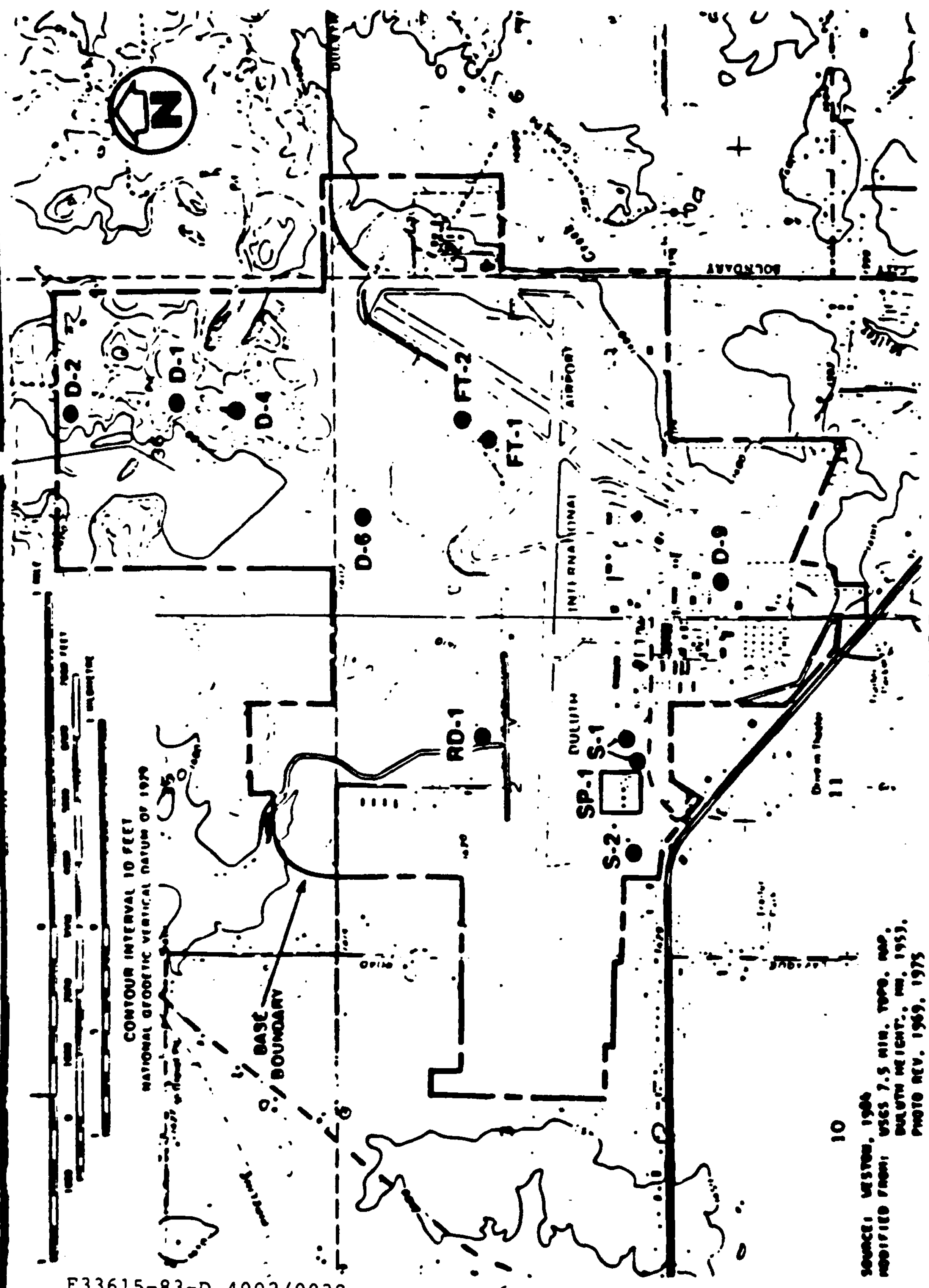


FIGURE 1
LOCATIONS OF ALL POTENTIAL SOURCES OF CONTAMINATION RECEIVING PHASE I HARM SCORE RANKINGS

3. Provide on site analysis of pH, temperature, and specific conductance for all water samples collected. Comply with the following references concerning sample collection, maximum holding time, sample preservation, etc: Standard Methods for the Examination of Water and Wastewater, 16th Ed. (1985), pp. 37-44; ASTM, Section 11, Water and Environmental Technology; Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057; Methods for Chemical Analysis of Waters and Wastes, EPA Manual 600/4-79-020, pp. xiii to xix (1983); and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd Ed. (USEPA, 1984). Meet the required detection limits of the applicable EPA method identified in Table 4 for all water and soil chemical analyses.

4. Determine the areal extent of the sites by reviewing available aerial photos of the base, both historical and the most recent panchromatic and infrared. Report the sources of this data.

5. Split all water and soil samples. One set of samples shall be analyzed by the contractor and the other set of samples shall be delivered immediately (the same collection day) to the field government Point Of Contact (POC). The field POC will select 10% of the split samples for subsequent shipment and analysis and deliver them to the contractor within 4 hours of receipt. The contractor shall supply all packing and shipping materials for the field POC's use in packaging the split samples. The contractor shall accept from the field POC the packaged samples for immediate shipment (within 24 hours) for analysis through overnight delivery to:

USAFOEHL/SA
Bldg 140
Brooks AFB TX 78235-5501

Include the following information with samples sent to the USAF OEHL:

a. Purpose of sample (analyte)

b. Installation name (Base)

c. Sample number (on container)

d. Source/location of sample

e. Contract Task Numbers and Title of Project

f. Method of collection (bailer, suction pump, air-lift pump, etc)

g. Volumes removed before sample taken

h. Special Conditions (use of surrogate standard, etc.)

i. Preservatives used (indicate if nonstandard)

j. Date and time of sampling

k. Sampler's name

Forward this information with each sample by properly completing an AF

orm 2752A "Environmental Sampling Data" and/or AF Form 2752B "Environmental ampling Data-Trace Organics," mailed under separate cover. Label each sample container to reflect the data in (a), (b), (c), (i), (j), and (k) bove. In addition, attach copies of field logs which document sample ollection.

Complete and maintain chain-of-custody records for all samples, field blanks, and quality control duplicates.

6. Install groundwater monitor wells using the following specifications:

a. Comply with the U.S. EPA Publication 330/9-S1-002, NEIC Manual for Ground Water /Subsurface Investigations at Hazardous Waste Sites for monitor well installation. Also comply with state and local regulatory agency requirements concerning well drilling, development and purging, and groundwater sampling methods.

b. Drill each well using conventional hollow-stem auger techniques. Where refusal is encountered due to boulders before the required well completion depth is achieved, use diamond core drilling to complete the borehole. Take samples for stratigraphic description and logging at five-foot intervals using standard split spoon techniques. lude each pilot boring log and well completion summary in the Final Report (as specified in Item VI below).

c. Collect soil samples for laboratory analysis from well boreholes as directed in section B. Where the depths and/or boreholes from which soil samples should be collected at a site are not specified in Section B, actual sample locations (borehole and depth) are at the field supervisor's discretion; however, samples should be limited to areas of suspected contamination. At sites where soil samples are specified in Section B to be collected from designated boreholes and at certain depths, variations may occur at the field supervisors discretion to ensure zones of suspected contamination are sampled. Do not collect or analyze more soil samples than authorized in Section B.

d. Install wells at a sufficient depth to collect samples representative of aquifer quality and to intercept floating contaminants. velop each well as soon as practical after completion by surging with air-lift pump or bailer. Do not introduce foreign materials into the well during development. Continue well development until the discharge water is clear and free of sediment to the fullest extent possible, and the pH, temperature and specific conductance have stablized.

e. Construct a maximum of 30 wells using two-inch inside diameter, stainless steel casing. Use threaded screw-type joints only. Flush thread all connections. Screen 15 feet in each well using two-inch diameter stainless steel casing with up to 0.010 inch slots. Well screening should extend ten feet into the aquifer and five feet above the water table to collect floating contaminants and allow for yearly fluctuations in the water table; however, this may not alway be possible due to site-specific groundwater conditions. Do not extend well screens to the ground surface, a minimum two foot bentonite or cement grout seal is required above all well screens, see paragraph 6.g. below. Cap the bottom of the screen. Well installation shall not exceed 1000 linear feet.

f. Should a confining layer below the saturated zone be encountered while attempting to drill deep enough to install 15 feet of

screen, grout the hole in the confining layer to prevent potential contaminant migration and screen the well above the confining layer.

g. Once the casing is installed, remove the augers and allow the soil formation to collapse around the well screen. Supplement the natural gravel pack with washed and bagged rounded sand or gravel with a grain size distribution compatible with the screen and formation. Place the gravel pack from the bottom of the borehole to two feet above the top of the screen. Tremie a granulated, pelletized, or slurry bentonite seal above the gravel/sand pack. Install the bentonite to a minimum thickness of two feet, and ensure a complete seal forms. Place Type I Portland cement grout from the bentonite seal to the land surface.

h. Complete the wells by extending the well casing a minimum of two feet above land surface. The height of the casing riser must take into account standing surface water depths during the wet season to prevent surface waters from cascading down the well casing. Provide an end-plug or casing cap for each well. Shield the extended stainless steel with a steel guard pipe which is placed over the casing and cap, and seated in a 16-inch by 16-inch by 4-inch concrete surface pad. Slope the pad away from the well casing. Install a lockable cap or lid on the steel guard pipe. Install three four-inch diameter steel guard posts if the base determines the well is in an area which needs such protection. The guard posts shall each be eight feet in total length and installed radially from each wellhead. Recess the guard posts approximately four feet into the ground and insure they are removable to facilitate access for sampling pump installation. Paint the protective steel pipe and clearly number the well on the sleeve exterior.

i. Determine by survey the elevation at the top of the casing of all newly installed monitor wells to an accuracy of 0.01 feet with respect to a base bench mark. Horizontally locate the new wells to an accuracy of 1.0 feet and record the position on both project and site specific maps. Bench marks must have previously been established from and are traceable to a USCGS/USGS survey marker.

j. Measure water levels at all monitor wells as feet below the ground surface or below the top of casing elevation to the nearest 0.01 feet. Report in terms of mean sea level. Measure static water levels in the wells prior to sampling and at well development. After the wells have recovered from water sample collection, measure water levels to confirm previous measurements.

7. Allow wells to stabilize after development for a minimum of 24 hours prior to sampling. Purge wells prior to sampling until a minimum of three well volumes of water have been displaced and the pH, temperature, specific conductance, color, and odor of the discharge have stablized. Use a stainless steel or teflon bailer, or air-lift pump to purge wells. Sample using a bottom-discharge Teflon bailer.

8. If the well(s) cannot be sampled due to well development, well characteristics, or other reason(s), indicate the reason(s) in the report specified in Item VI.

9. Collect and analyze one round of water samples from all groundwater monitor wells. During sample collection from all wells, examine the surface of the water table for the presence of hydrocarbons and, if applicable, measure the thickness of the hydrocarbon layer.

10. Soil Borings

a. Conduct 19 soil borings not to exceed a maximum of 250 linear feet. The average estimated boring depth is ten feet except where noted in Section B. Accomplish the borings using hollow-stem auger techniques. Obtain samples using ASTM Method D-1526.

b. During the boring operations, take samples at two and one-half foot intervals to develop lithographic descriptions and stratigraphic logs. Monitor the auger cuttings for signs of changing formations. Place special emphasis on field identification of contaminated soils encountered.

c. Scan all soil samples with a photoionization meter or equivalent organic vapor detector. Include monitoring results in the boring logs.

d. Whenever possible, measure water levels in all boreholes after the water level has stabilized.

e. Grout all boreholes to the surface. It is especially important to ensure that they be adequately resealed to preclude future -'gration of contaminants.

f. Permanently mark each location where soil borings are drilled. Record the location on a site specific map.

11. Collect pond sediment samples using a drop corer device or an Ekman dredge. Obtain surface soil samples using a stainless steel spoon or spade. Decontamination procedures outlined below are applicable.

12. Analyze water and soil samples collected as specified in Section B for those parameters summarized in Table 2. Laboratories conducting the analyses of samples must be certified as required by state or other regulatory agency standards as applicable in the State of Minnesota. The required detection limits and methods for these analyses are delineated in Table 4. Maintain all raw laboratory data for a minimum of five years after project completion and provide raw data to the USAFOEHL upon quest.

13. Methods which employ gas chromatography (GC) as the analytical technique--EPA Methods 601, 602, 608, 615, 8010, 8020, 8080, 8150--require positive confirmation of identity for all analytes having concentrations higher than the Method Detection Limit (MDL). This positive confirmation shall be conducted by second-column GC; however, gas chromatography/mass spectroscopy (GC/MS) can be used for positive confirmation if the quantity of each analyte to be confirmed is above the detection level of the GC/MS instrument. Analytes which cannot be confirmed will be reported as "Not Detected" in the body of the report, but the results of all second-column GC or GC/MS confirmational analyses are to be included in the report appendix along with other raw analytical data. Quantification of confirmed analytes will be based upon the first column analysis. The maximum number of confirmational analyses that will be funded under this delivery order is fifty percent (50%) of actual field samples. The total number of samples for each GC method listed in Table 2 includes this allowance.

14. Analyze an additional 15% of all sample parameters for quality

control purposes. Field blanks must be an integral part of the quality control program. Provide all quality control sample analysis results in the report.

15. Plot and map all field data collected for each site according to surveyed positions. Identify or estimate the nature of contamination, its magnitude, and the potential for contaminant flow to receiving streams and ground water.

16. Remove all borehole cuttings and clean the general area following the completion of each well and boring. Properly containerize cuttings suspected of being contaminated (based on discoloration, odor or organic vapor detection instrument). Test the suspected contaminated waste for EP Toxicity and Ignitibility. The contractor shall be responsible for transporting drums containing suspected contaminated soils. The contractor shall be responsible for the ultimate disposal of contaminated soils in accordance with current Federal, State, and/or local hazardous waste disposal laws. The contractor shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact referenced in paragraph V for those borehole cuttings obtained from TAC sites (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).

17. Decontaminate all sampling and well purging equipment prior to use and between samples to avoid cross contamination. As a minimum, wash equipment with a laboratory-grade detergent followed by a distilled water rinse, repeating the rinsing procedure two more times. Where field conditions warrant, follow the laboratory-grade detergent wash with a hexane rinse, rinse with distilled water, and finally wash with dilute nitric acid and rinse again with distilled water. Allow sufficient time for the solvent to evaporate and for the equipment to dry completely. The calibrated water level indicator for measuring well volume and fluid elevation must be decontaminated before use in each well.

18. Thoroughly clean and decontaminate the drilling rig and tools before initial use and after each borehole completion. As a minimum, steam clean drill bits after each borehole is installed. Drill from the <u>least</u> to the <u>most</u> contaminated areas, if possible.

19. Evaluate available techniques for well abandonment that are applicable to the type of monitor wells and geological conditions at Duluth IAP. Consider that these wells will be abandoned at some future date after the study objectives have been met and they are no longer needed. Recommend a candidate abandonment method or technique, including costs. Ensure abandonment techniques comply with state and local rules. The actual process of well abandonment is not part of this study.

20. Perform an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.

21. Conduct a literature search of local hydrogeologic conditions to complement the Phase I and Phase II Reports. Use this data to determine optimum well locations. Include the pertinent literature search information in Appendix D of the Final Report. Develop the literature search data using the following guideline:

a. Topographic data

b. Geologic data

(1) Structure
(2) Stratigraphy
(3) Lithology

c. Hydrologic data

(1) Location of existing wells, observation holes and springs within a one-mile radius of sites to be investigated.

(2) Groundwater table and piezometric contours

(3) Depth to water

(4) Quality of water

d. Data on existing wells, observation holes, and springs withi a one-mile radius of sites to be investigated.

(1) Location, depth, diameter, types of wells, and construction logs

(2) Static and pumping water level, hydrographs, yield, specific capacity, and quality of water

(3) Present and projected groundwater development and anticipated use

(4) Corrosion, incrustation, well interference, and similar operation and mainte ance problems

(5) Location, type, geologic setting, and hydrographs of springs

(6) Observation well networks

(7) Existing water sampling sites

e. Aquifer data

(1) Type, such as unconfined, artesian, or perched

(2) Thickness, depth, and formation designation

(3) Boundaries

(4) Transmissivity, storativity, and permeability

(5) Specific retention

(6) Discharge and recharge

(7) Ground and surface water relationships

(8) Aquifer models

f. Climatic data

(1) Precipitation

(2) Evapotranspiration

B. In addition to the general items delineated in A above, conduct the following specific actions at the sites identified in Table 1 and Figure 1 (required analytical parameters are listed in Table 2):

1. Site 1 (TAC) - Goose Dump 1(D-1)

a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of groundwater flow. Collect one groundwater sample from each monitor well. During the borehole drilling collect a maximum of four soil samples for laboratory analysis, see I.A.6.c.

b. Drill one soil boring in the suspected zone of contaminatic and collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half and five foot depths.

c. Designate two sampling points from surface waters located a the site, or from surface waters adjacent to and downstream of the site.

d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.

e. Analyze all water and soil samples for volatile organic and aromatic compounds (VOA), oil and grease (O&G), pesticides/herbicides (P/H), polychlorinated biphenyls (PCBs), phenols and metals.

2. Site 2 (ANG) - Fire Training Areas 1 and 2 (FT-1 and FT-2)

a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of groundwater flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of groundwater flow; two between FT-1 and FT-2 on either side of the access road and two north of FT-2. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis, see I.A.6.c.

b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the ground surface and the two and one-half and five foot depths.

c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundry of site FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.

d. Collect one surface sediment sample and one surface water

sample from the swamp to the north and downgradient of FT-2.

e. Collect one round of groundwater samples from the six existing monitor wells at these sites.

f. Analyze all water and soil samples for VOA, O&G and phenols.

3. Site 3 (ANG) - DPDO Storage Area "C" (S-2)

a. Drill and construct a maximum of four monitor wells. The positioning, and soil and water sampling follows that specified at Site 1, para B.1.a.

b. Drill three soil borings positioned along a center-line running north to south in the storage area. Follow the soil sampling plan specified at Site 1, para B.1.b.

c. Designate sampling points in the drainageway which begins on the east side of the storage area and then heads in a northwesterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water sample in the approximate location of Sample 2 identified in the Stage 1 study. bsequent sample points should be at 100 foot intervals downgradient along ne drainageway.

d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

4. Site 4 (ANG) - Tank Farm Area (SP-1)

a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50 foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main access road. A former fueling facility is located south of the tank farm.

b. Drill and construct a maximum of four monitor wells. The ll positioning, and soil and water sampling follows that specified at Site 1, ra B.1.a.

c. Drill five soil borings, position them based upon the geophysical survey result and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at two and one-half foot intervals beginning at ground surface. Analyze the samples collected at two and one-half, five, and seven and one-half foot depths.

d. Designate sample points in the drainageways/culverts around the site, of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.

e. Collect one round of groundwater samples from the four existing monitor wells at this site.

f. Analyze all water and soil samples for VOA and O&G.

5. Site 5 (TAC) - South Goose Dump (D-4)

a. This site was originally designated D-4, South Goose Missle Site Dump, in the Phase I report and was not recommended for Phase II Stage 1 evaluation. However, during Phase II Stage 1, it was erroneously confused with D-1, Goose Missle Site Dump, which was recommended for Phase II Stage 1 monitoring. Consequently, this site was studied during the Phase II Stage 1 effort, but referenced as site D-1 throughout the report.

b. Drill and construct three monitor wells. Position two of the wells approximatley 50 feet from the site perimeter and consistent with the assumed downgradient direction of groundwater flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of groundwater flow so as to collect ambient water quality information. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis, see I.A.6.c.

c. Collect three surface water samples from the pond/swamp at this site.

d. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways which exit this site.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

6. <u>Site 6 (TAC) - Goose Dump 2 (D-2)</u>

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more work.

c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at two and one-half feet for ethylene glycol, O&G and VOA.

7. <u>Site 7 (TAC) - Runway 13 NE Disposal (D-6)</u>

a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.

c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half foot depth.

d. If surface drainage from the site can be located, collect

one each bottom sediment and surface water sample outside, but within 20 feet, of the site boundry.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

8. Site 8 (ANG) - Old DPDO Storage Area (S-1)

a. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.

b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified at Site 1, B.1.b.

c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.

d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

9. Site 9 (TAC) - Disposal Pit (D-9)

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.

c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at two and one-half foot intervals and analyze the samples at two and one-half feet above and below the water table.

d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Collect one groundwater sample.

e. Analyze all water and soil samples for acetone and picric acid.

10. Site 10 (ANG) - Low-Level Radioactive Waste Disposal (RD-1)

a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.

b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Place the third well in the assumed upgradient direction of groundwater flow to collect ambient water quality information. Do not analyze soil samples from these boreholes.

c. Collect one groundwater sample from each well and analyze them for gross alpha, gross beta, radium - 226 and radium - 228.

C. Field Coordination

Notify the Air Force POC's (see section V) at the USAFOEHL and Duluth IAP at least five days in advance of water sample collection dates.

D. Technical Field Operations Plan

Develop a detailed field operations plan based upon the technical requirements specified in this task description for the proposed work effort. Be explicit with regards to field procedures. Include, but do not limit the plan to, field decontamination operations, sampling protocol, QA/QC field procedures, field schedule, etc. A guideline for the plan is provided under separate cover. Reference paragraph VI, Sequence No. 2.

E. Health and Safety

Comply with all applicable USAF, OSHA, EPA, state and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of personnal protection at study sites. Prepare a written Health and Safety Plan for the proposed work effort and coordinate it directly with regulatory agencies where required. Provide an information copy of the Health and Safety Plan to the USAFOEHL prior to commencing field operations (i.e., drilling and sampling). (Reference paragraph VI, Sequence No. 7)

F. Data Review

1. Tabulate field and analytical laboratory results (including quality control data), and incorporate them into the monthly R&D Status Reports. Forward them to the USAFOEHL for review as soon as they become available as specified in Item VI below. In addition to the results, report the dates of sample collection, extraction (if applicable) and analysis.

2. Upon completion of all analyses, tabulate and incorporate all results into an Informal Technical Information Report (Atch 1, Seq 3 as specified in the contract and in Item VI below) and forward the report to the USAFOEHL for review.

3. Immediately report to the USAFOEHL Program Manager via telephone, data/results generated during this investigation which indicate a potential health risk (for example, a contaminated drinking water aquifer).

G. Reporting

1. Prepare two draft reports following the USAFOEHL-supplied report format (mailed under separate cover). One report shall delineate the findings for the TAC sites (Sites 1, 5, 6, 7, and 9). The second report shall detail the findings at the ANG sites (Sites 2, 3, 4, 8, and 10). Forward the reports to the USAFOEHL (as specified in item VI below) for Air Force review and comment.

2. Review the results, conclusions and recommendations from previous IRP investigations which concern the sites listed in this task. Integrate all investigative work done at each site to date so the report reflects the total available information for each site. Use this cumulative information and data to establish trends and develop conclusions and recommendations.

3. Include in this report a discussion of regional/site-specific hydrogeology, well and borings logs, data from water level surveys, groundwater surface and gradient maps, and avalable hydrogeologic cross sections and geophysical survey data.

4. In the results section, include water and soil analysis results, field quality control sample data (field blanks, duplicates, etc.), internal laboratory quality control data (lab blands, lab spikes, and lab duplicates), and laboratory quality assurance information. Provide second-column confirmation results and include which columns were used, the conditions existing and retention times.

5. Make estimates of the magnitude, extent and direction in which detected contaminants are moving. Identify potential environmental consequences of discovered contamination based upon State and/or Federal standards.

6. Summarize the specific collection techniques, analytical method holding time and limit of detection used for each analyte (Standard Methods, EPA, ASTM, etc.).

7. In the recommendation section, address each site and list them by category. Category I consists of sites where no further action, including remedial action, is required. Data for these sites are considered sufficient to rule out unacceptable health or environmental risks. Category II sites are those requiring additional investigation to quantify or further assess the extent of current or future contamination. Category III denotes sites that will require remedial action (ready for IRP Phase IV). In the recommendations for Category III sites, include any possible influence on sites in Categories I and/or II due to their connection to the same hydrological system. Clearly state any dependency between sites in different categories. Include a list of candidate remedial action alternatives, including Long Term Monitoring (LTM) as remedial action, and the corresponding rationale that should be considered in selecting the remedial action for a given site. List all alternatives that could potentially bring the site into compliance with environmental standards. For contaminants that do not have standards, EPA recommended safe levels for non-carcinogens (Health Advisory or Suggested-No-Adverse-Response Levels) and target levels for carcinogens (1×10^{-6} cancer risk level) may be used. If not specifically requested, do not include a comprehensive cost or technical analyses of alternatives. However, in those situations where field survey data indicate immediate corrective action is necessary, present specific, detailed recommendations. For each category above, summarize the results of field data, environmental or regulatory criteria, or other pertinent information supporting conclusions and recommendations.

8. For those sites needing additional Phase II study, identify specific requirements, if any, for future monitoring. Identify potential environmental consequences of contamination. Provide estimates of costs by line items for additional investigations beyond this stage along with estimates of time required to accomplish the investigation. Furnish the cost data in a separately bound appendix to the final report. (Reference paragraph VI, Sequence No. 2)

9. Provide an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.

10. Include in an appendix to the report the names of all local, state or other regulatory personnel and the dates they approved well

drilling, development and purging techniques, well materials, and sampling methods. All well drilling, development, purging, and sampling must conform to State and local regulatory agency requirements.

11. Provide the candidate well abandonment techniques and the recommended techniques most appropriate for Duluth IAP.

H. Meetings

The contractors project leader shall attend two meetings to take place at a time to be specified by the USAF OEHL. Each meeting shall take place at Duluth IAP for a duration of one day (eight hours).

II. SITE LOCATION AND DATES

Duluth IAP MN
Date to be established

III. BASE SUPPORT

A. Prior to any contractor digging or drilling, locate underground utilities and issue digging permits.

B. Provide access to the Phase II Stage 1 monitoring wells.

C. Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, etc., as needed to evaluate sites under investigation.

D. The base Point Of Contact shall receive from the contractor the split samples, select 10% of them, package them, and then deliver them back to the contractor within 24 hours for subsequent overnight shipment to USAFOEHL/SA as stated in paragraph I.A.5.

E. Provide contractor with a secure staging area for storing quipment and supplies.

F. Provide a paved area where drilling equipment can be cleaned and decontaminated.

G. Base Civil Engineer will prepare and sign any hazardous waste manifest documentation resulting from this effort.

H. Base will store any drums containing suspected hazardous waste until determined to be hazardous/non-hazardous.

IV. GOVERNMENT FURNISHED PROPERTY: None

V. GOVERNMENT POINTS OF CONTACT:

1. 2Lt Gary Woodrum
USAFOEHL/TSS
Brooks AFB TX 78235-5501
AV 240-2158
(512) 536-2158
1-800-821-4528

2. Col Jerry Dougherty
HQ TAC/SGPB
Langley AFB, VA 23665-5001
AV 432-5857
(804) 764-2180

3. Lt Col Michael Washeleski
ANGSC/SGB
Andrews AFB, MD 20331-6008
AV 858-3443/5926
(301) 981-5926

4. Sgt Suzanne Schlies
148 TAC Clinic
Duluth IAP MN 55811-5000
AV 825-7223
(218) 723-7224

VI. In addition to sequence numbers 1, 5 and 11 listed in Attachment 1 to the contract, and which apply to all orders, the sequence numbers listed below are applicable to this order. Also shown are dates applicable to this order.

Seq. No.	Para. No.	Block 10	Block 11	Block 12	Block 13	Block 14
2	I.D.	O/TIME	86 OCT 10	86 OCT 13		15
7	I.E.	O/TIME	86 OCT 10	86 OCT 13		3
3	I.F.1.	O/TIME	*	*		3
4	I.G.(TAC)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	**
4	I.G.(ANG)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	**
2	I.G.8.	O/TIME	87 Jan 16	87 OCT 16		***
14		MONTHLY	86 OCT 27	86 NOV 11		
15		MONTHLY	86 OCT 27	86 NOV 11		

* Upon completion of the analytical effort and prior to submission of the first draft report.

** Two draft reports and one final report are required. Incorporate Air Force comments into the second draft and final report as specified by the USAF OEHL. Supply the USAFOEHL with a single copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute all report copies as specified by the USAFOEHL. Supply 25 copies of each draft report and 50 copies plus the original camera ready copy of the final report. Distribute the remaining 24 copies of each draft report and 49 copies of the final report as specified by the USAFOEHL.

*** Submit cost estimates (five copies) in a separately bound document with the final report only. Provide estimates for only those sites recommended for additional Phase II work (Category II) or Phase IV, long-term monitoring (Category III).

TABLE 2

SAMPLING AND ANALYTICAL REQUIREMENTS

DULUTH IAP

Analyte	Medium	SITE NUMBERS 1	2	3	4	5	6	7	8	9	10	QA (9)	2nd Column Confirmation (10)	TOTAL
VOA (1)	Water (7)	6	14	7	12	6	-	4	5	-	-	9	30	93
	Soil (8)	9	17	16	23	8	4	8	11	-	-	15	53	164
Oil & Grease (2)	Water	6	14	7	12	6	-	4	5	-	-	9	-	63
	Soil	9	17	16	23	8	4	8	11	-	-	15	-	111
Metals (3)	Water	6	-	7	-	6	-	4	5	-	-	5	-	33
	Soil	9	-	16	-	8	-	8	11	-	-	9	-	61
Pesticides/ (4) Herbicides	Water	6	-	7	-	6	-	4	5	-	-	5	16	49
	Soil	9	-	16	-	8	-	8	11	-	-	9	29	90
PCB	Water	6	-	7	-	6	-	4	5	-	-	5	16	49
	Soil	9	-	16	-	8	-	8	11	-	-	9	29	90
Phenol	Water	6	14	7	-	6	-	4	5	-	-	8	-	50
	Soil	9	17	16	-	8	-	8	11	-	-	11	-	80
Acetone	Water	-	-	-	-	-	-	-	-	1	-	1	-	2
	Soil	-	-	-	-	-	-	-	-	2	-	1	-	3
Picric Acid	Water	-	-	-	-	-	-	-	-	1	-	1	-	2
	Soil	-	-	-	-	-	-	-	-	2	-	1	-	3
Ethylene Glycol	Soil	-	-	-	-	-	4	-	-	-	-	1	-	5
Radiation (5)	Water	-	-	-	-	-	-	-	-	-	3	1	-	4
EP Toxicity (6) Metals	Soil Cuttings	15	samples authorized as needed - not specified by site									2	-	17
EP Ignitibility	Soil Cuttings	15	samples authorized as needed - not specified by site									2	-	17

NOTES: (See following page)

TABLE 2 (Continued)

NOTES:

(1) See Table 3.

(2) Use Method 3550 to extract oil and grease from soil.

(3) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver

(4) See Table 5.

(5) Includes analysis for Gross Alpha, Gross Beta, Radium-226 and Radium-228.

(6) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver

(7) Includes both well and surface water samples.

(8) Includes both borehole and sediment samples.

(9) QA is 15% of the basic sample load.

(10) Assumes 50% for Methods 601, 602, 608, 615, 8010, 8020, 8080 and 8150 will require second column confirmation.

TABLE 3

VOLATILE ORGANIC COMPOUNDS (VOA)

PURGEABLE HALOCARBONS
EPA Methods 601 and SW 8010

Bromodichloromethane
Bromoform
Bromomethane
Carbon tetrachloride
Chlorobenzene
Chloroethane
2-Chloroethylvinyl ether
Chloroform
Chloromethane
Dibromochloromethane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
1,3-Dichloropropene
trans-1,3-Dichloropropene
Methylene chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

PURGEABLE AROMATICS
EPA Methods 602 and SW 8020

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene

Also: Xylene

TABLE 4

ANALYTICAL PARAMETERS, METHODS AND REQUIRED DETECTION LIMITS

PARAMETER	METHOD	DETECTION LIMIT
Oil and Grease (Using IR)	EPA 413.2	20 μg/g soil [a] 1 mg/l water
Volatile Organic and Aromatic Compounds (VOA)	EPA 601 and 602 SW 8010 and 8020	b b
EP Toxicity	b	c
Ignitibility	SW 1010	d
Pesticides and/or PCB	EPA 608 SW 3550 and 8080	e 1 μg/g soil
Herbicides	EPA 615 SW 8150	e 1 μg/g soil
Phenol	EPA 420.2	5 μg/l water 5 μg/g soil
Metals		
Arsenic [f]	EPA 206.2 SW 3050 and 706	10 μg/l water 1 μg/g soil
Barium [f]	EPA 208.2 SW 3050 and 6010	200 μg/l water 20 μg/g soil
Cadmium [f]	EPA 213.2 SW 3050 and 6010	10 μg/l water 1 μg/g soil
Chromium [f]	EPA 218.1 SW 3050 and 6010	50 μg/l water 5 μg/g soil
Lead [f]	EPA 239.2 SW 3050 and 6010	20 μg/l water 2 μg/g soil
Mercury [f]	EPA 245.1 SW 7471	1.0 μg/l water 0.1 μg/g soil
Selenium [f]	EPA 270.3 SW 3050 and 7740	10 μg/l water 1 μg/g soil
Silver [f]	EPA 272.2 SW 3050 and 6010	10 μg/l water 1 μg/g soil

TABLE 4 (Continued)

PARAMETER	METHOD	DETECTION LIMIT
Acetone	ASTM D 3695-82	-
Picric Acid	USATHAMA 2B	-
Ethylene Glycol	NIOSH P & CAM 338 Modified for Soil	-
Gross Alpha	Standard Methods: 15th ed, 703	-
Gross Beta	Standard Methods: 15th ed, 703	-
Radium-226	EPA 600/4-80-032, 903.0	-
Radium-228	EPA 600/4-80-032, 904.0	

TABLE 4 (Continued)

[a]Based on extracting 50 grams of soil and 100 ml final extract volume.

[b]Detection limits for Purgeable Organics and Aromatics shall be as specified for the compounds by EPA Methods 601-602. Method: Federal Register, Vol. 44, including these items:

Item 1.4 - This method is recommended by EPA for use only by experienced residue analysts or under the close supervision of such qualified persons.

Item 2.2 - This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary chromatographic column that will be helpful in resolving the compounds of interest from interferences. This must be done in the case of vinyl chloride and so noted in the analysis report.

Items 3.3, 7.1-7.3 - These sections must be analyzed within the recommended holding times.

Item 8.3 - All samples must be analyzed within the recommended holding times. This must be followed without exception.

If questions are encountered about certain contaminants, you may be asked to show both chromatograms used to rule out possible interferences.

[c]

Metals	µg/l of Extract
As	0.053
Ba	0.1
Cd	0.005
Cr	0.05
Pb	0.1
Hg	0.0002
Se	0.075
Ag	0.01

[d]Find if sample is ignitable at 140 degrees Fahrenheit or below. If so, it is a hazardous waste.

[e]Method Detection Limit

[f]Primary Drinking Water Standard, 40 CFR 141.11

TABLE 5

Pesticides and PCBs - EPA Methods 608 and SW 8080

aldrin	a-BHS
dieldrin	b-BHC
chlordane	g-BHC
4,4'-DDT	w-BHC
4,4'-DDE	PCB-1242
4,4'-DDD	PCB-1254
a-endosulfan	PCB-1221
b-endosulfan	PCB-1232
endosulfan sulfate	PCB-1248
endrin	PCB-1260
endrin aldehyde	PCB-1016
heptachlor	toxaphene
heptachlor epoxide	

Herbicides - EPA Method 615 and SW 8150

2,4-D
2,4,5-T
2,4,5-TP (Silvex)

PART I SECTION F OF THE SCHEDULE
SUPPLIES SCHEDULE DATA

1. PROC INSTRUMENT ID NO. (PIIN): F33615-83-D-4002
2. SPIIN: 0038
3. PAGE 28 OF 28

4. ITEM NO. 0001 | 5. ACRN AA | 6. TSP PRI | 7. MILSTRIP DOC NO. AND SUFFIX | 8. CON ITEM SERIAL NO. | 9. ENDING SERIAL NO. (WHEN APPL) | 10. CLIN IDENT EXHIBIT

11. DEL SCHED DATE A. 87JUL01 | 12. ENDING DATE (WHEN APPL) A. | 13. DEL SCHEDULE QTY* A. 1 | 14. SCTY CLAS U | 15. SHIP TO FY7624 | 16. MARK FOR

11. DEL SCHED DATE B. C. D. E. | 12. ENDING DATE (WHEN APPL) B. C. D. E. | 13. DEL SCHEDULE QTY* B. C. D. E.

17. DESCRIPTIVE DATA

A. SEE SECTION H OF THE BASIC CONTRACT FOR FY7624 ADDRESS.

B. TECHNICAL EFFORT SHALL BE COMPLETED NO LATER THAN 87JAN16.
C. ALL DATA SHALL BE DELIVERED IAW ATTACHMENT# 1 OF THE BASIC CONTRACT AS IMPLEMENTED BY PARAGRAPH VI OF THE TASK DESCRIPTION NO LATER THAN 87JUN01.
D. THE DATA SHALL BE ACCEPTED BY THE GOVERNMENT NOT LATER THAN THE DATE SHOWN IN BLOCK 11A

4. ITEM NO. 0002 | 5. ACRN AA | 6. TSP PRI | 7. MILSTRIP DOC NO. AND SUFFIX | 8. CON ITEM SERIAL NO. | 9. ENDING SERIAL NO. (WHEN APPL) | 10. CLIN IDENT EXHIBIT

11. DEL SCHED DATE A. 7JUL01 | 12. ENDING DATE (WHEN APPL) A. | 13. DEL SCHEDULE QTY* A. 1 | 14. SCTY CLAS U | 15. SHIP TO FY7624 | 16. MARK FOR

11. DEL SCHED DATE B. C. D. E. | 12. ENDING DATE (WHEN APPL) B. C. D. E. | 13. DEL SCHEDULE QTY* B. C. D. E.

17. DESCRIPTIVE DATA

A. SEE SECTION H OF THE BASIC CONTRACT FOR FY7624 ADDRESS.

B. TECHNICAL EFFORT SHALL BE COMPLETED NO LATER THAN 87JAN16.

4. ITEM NO. 004 | 5. ACRN AA | 6. TSP PRI | 7. MILSTRIP DOC NO. AND SUFFIX | 8. CON ITEM SERIAL NO. | 9. ENDING SERIAL NO. (WHEN APPL) | 10. CLIN IDENT EXHIBIT

11. DEL SCHED DATE A. 87JUL01 | 12. ENDING DATE (WHEN APPL) A. | 13. DEL SCHEDULE QTY* A. 1 | 14. SCTY CLAS U | 15. SHIP TO FY7624 | 16. MARK FOR

11. DEL SCHED DATE B. C. D. E. | 12. ENDING DATE (WHEN APPL) B. C. D. E. | 13. DEL SCHEDULE QTY* B. C. C. E.

17. DESCRIPTIVE DATA

A. SEE SECTION H OF THE BASIC CONTRACT FOR FY7624 ADDRESS.

B. TECHNICAL EFFORT SHALL BE COMPLETED NO LATER THAN 87JAN16.
C. ALL CHEMICAL ANALYSIS DATA SHALL BE DELIVERED IAW ATTACHMENT# 1 AS IMPLEMENTED BY PARAGRAPH VI OF THE TASK DESCRIPTION NO LATER THAN 87JUN01.
D. THE DATA SHALL BE ACCEPTED BY THE GOVERNMENT NOT LATER THAN THE DATE SHOWN IN BLOCK 11A

*REPRESENTS A NET INCREASE/DECREASE WHEN NO + OR – APPEARS AFTER THE ITEM NO.
E = ESTIMATED

– (IN QTY) = DECREASE

+ OR – (IN ITEM NO.) = ADDITION OR DELETION

AFSC FORM JAN 81 706 PREVIOUS EDITION WILL BE USED. AFSC — Andrews AFB Md 1979

APPENDIX C

WELL NUMBERING SYSTEM

GROUND WATER WELL AND SOIL BORING NUMBERING SYSTEM

GROUND WATER MONITOR WELL

The ground water monitor well numbering system consists of three fields. Field 1 is the abbreviation "GW", which indicates ground water. This distinguishes these monitor wells from the Phase II, Stage 1 monitor wells, which were labeled "MW".

Field 2 indicates the site number of the well location and is as follows:

Site Number	Phase I Number	Site Description
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (ANG)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2 (borings only)
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit (no work done)
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

Field 3 indicates the sequential order in which the monitor wells are drilled, lettered consecutively beginning with the letter "A".

SOIL BORING

The soil borings are numbered according to a system similar to that used for the ground water monitor wells. Field 1 is the abbreviation "B", which indicates boring. Field 2 indicates the site number of the boring location (i.e., 1). Field 3 indicates the sequential order in which the borings are drilled, lettered consecutively beginning with the letter "A".

APPENDIX D

BORING AND WELL COMPLETION LOGS

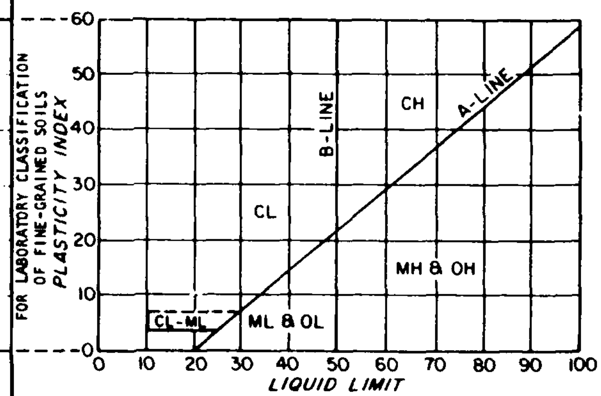
MAJOR DIVISIONS			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL SAND SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL SAND CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND SILT MIXTURES
				SC	CLAYEY SANDS, SAND CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

SOIL CLASSIFICATION CHART

MATERIAL SIZE	PARTICLE SIZE			
	LOWER LIMIT		UPPER LIMIT	
	MILLIMETERS	SIEVE SIZE*	MILLIMETERS	SIEVE SIZE*
SAND				
FINE	.074	#200*	0.42	#40*
MEDIUM	0.42	#40*	2.00	#10*
COARSE	2.00	#10*	4.76	#4*
GRAVEL				
FINE	4.76	#4*	19.1	3/4"*
COARSE	19.1	3/4"*	76.2	3"*
COBBLES	76.2	3"*	304.8	12"*
BOULDERS	304.8	12"*	914.4	36"

*U. S. STANDARD *CLEAR SQUARE OPENINGS

GRADATION CHART



PLASTICITY CHART

KEY TO SAMPLES:

THE NUMBER OF BLOWS REQUIRED TO DRIVE THE 3.25" O.D. BY 2.42" I.D. DAMES & MOORE TYPE U SAMPLER 12" OR LENGTH INDICATED WITH A 330 POUND HAMMER FALLING 30".

9 ■ DEPTH OF RELATIVELY UNDISTURBED SAMPLE OBTAINED WITH THE DAMES & MOORE SAMPLER.

⊠ DEPTH OF DISTURBED SAMPLE OBTAINED WITH THE DAMES & MOORE SAMPLER.

□ DEPTH OF SAMPLING ATTEMPT WITH NO RECOVERY USING THE DAMES & MOORE SAMPLER.

THE NUMBER OF BLOWS REQUIRED TO DRIVE THE 2.0" O.D. BY 1.4" I.D. STANDARD SPLIT SPOON SAMPLER 12" OR LENGTH INDICATED WITH A 140 POUND HAMMER FALLING 30".

15 ▣ DEPTH OF DISTURBED SAMPLE OBTAINED WITH THE SPLIT SPOON SAMPLER.

▨ DEPTH OF SAMPLING ATTEMPT WITH NO RECOVERY USING THE SPLIT SPOON SAMPLER.

KEY TO LABORATORY TEST DATA:

2200 (1300) —— CONFINING STRESS

—— SHEAR STRENGTH DETERMINED BY UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST.

PP=2500 SHEAR STRENGTH DETERMINED BY POCKET PENETROMETER.

NOTES: 1. DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE CLASSIFICATIONS OR INTERMIXED STRATA.
2. WHEN USED ON THE BORING LOGS, THE FOLLOWING TERMS ARE USED TO DESCRIBE THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE COMPACTNESS OF COHESIONLESS SOILS:

COHESIVE SOILS	(APPROXIMATE SHEARING STRENGTH IN KSF)	COHESIONLESS SOILS	
VERY SOFT	LESS THAN 0.25	VERY LOOSE	THESE ARE USUALLY
SOFT	0.25 TO 0.5	LOOSE	BASED ON AN EXAMINATION
MEDIUM STIFF	0.5 TO 1.0	MEDIUM DENSE	OF SOIL SAMPLES,
STIFF	1.0 TO 2.0	DENSE	PENETRATION RESISTANCE,
VERY STIFF	2.0 TO 4.0	VERY DENSE	AND SOIL DENSITY DATA
HARD	GREATER THAN 4.0		

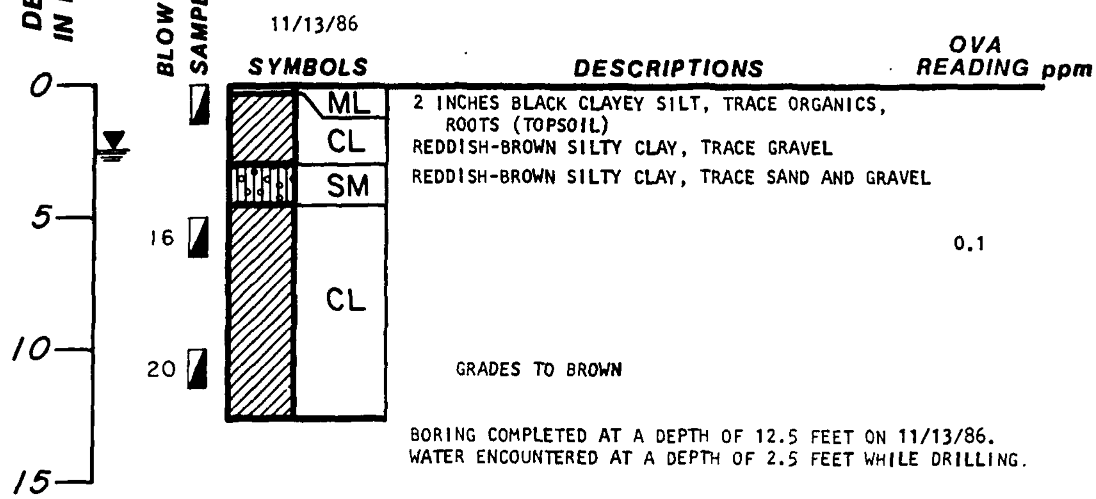
3. WHEN USED ON THE BORING LOGS, THE FOLLOWING TERMS INDICATE THE PERCENTAGES OF THE MINOR SOIL COMPONENTS: SOME; 10 TO 20% TRACE; 0 TO 10%
4. ELEVATIONS REFER TO MEAN SEA LEVEL (MSL).

UNIFIED SOIL CLASSIFICATION SYSTEM AND KEY TO LOG OF BORINGS

Dames & Moore

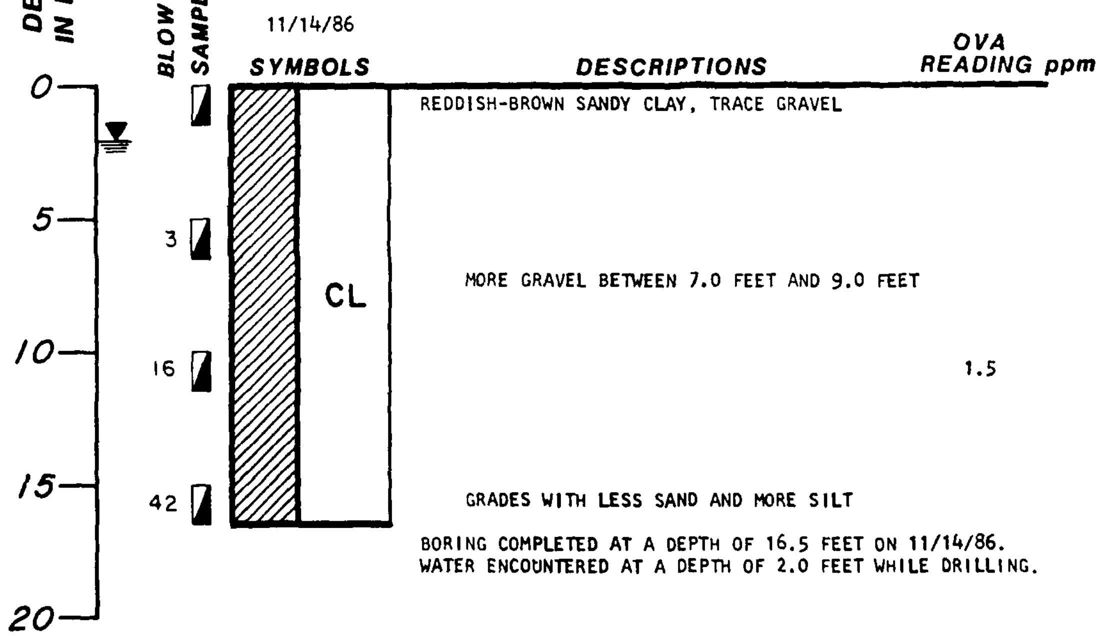
BORING GW2-A

SURFACE ELEVATION 1434.52



BORING GW2-B

SURFACE ELEVATION 1433.44



LOG OF BORINGS

Dames & Moore

BORING GW2-C

SURFACE ELEVATION 1435.70

11/14/86

DEPTH IN FEET	BLOW COUNTS	SAMPLES	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	3	■	CL	REDDISH-BROWN SILTY CLAY	
			SC	REDDISH-BROWN CLAYEY MEDIUM TO COARSE SAND, SOME SILT	
			CL	REDDISH-BROWN SILTY CLAY	
5	19	■			0.3
10	27	■		CRADES WITH SOME SAND AND GRAVEL	4.3
			SM	REDDISH-BROWN SILTY FINE SAND, SOME GRAVEL	
15	49	■			3
			ML	BROWN SANDY SILT, SOME CLAY	
20	38	■		AUGER REFUSAL	
25					

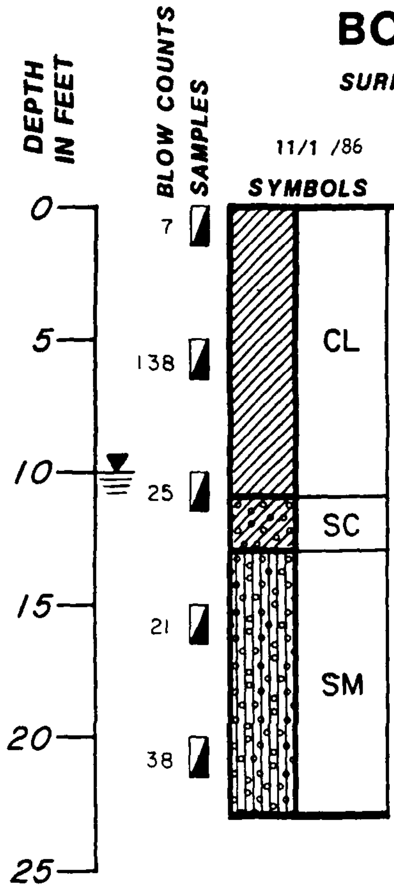
BORING COMPLETED AT A DEPTH OF 21.5 FEET ON 11/14/86.
WATER ENCOUNTERED AT A DEPTH OF 6.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

BORING GW2-D

SURFACE ELEVATION 1427.28



DESCRIPTIONS	OVA READING ppm
REDDISH-BROWN SILTY CLAY, TRACE GRAVEL, OCCASIONAL COBBLES AND BOULDERS	
	0.2
GRAY CLAYEY MEDIUM TO COARSE SAND, SOME SILT	
BROWN SILTY MEDIUM TO COARSE SAND	
	60
	60

AUGER REFUSAL

BORING COMPLETED AT A DEPTH OF 23.0 FEET ON 11/17/ 86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

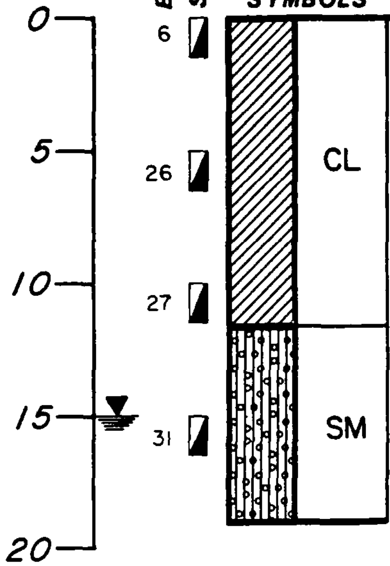
LOG OF BORINGS

Dames & Moore

BORING GW2-E

SURFACE ELEVATION 1425.38

DEPTH IN FEET | BLOW COUNTS | SAMPLES | 11/17/86 SYMBOLS | DESCRIPTIONS | OVA READING ppm



BROWN SILTY CLAY, TRACE GRAVEL

30

REDDISH-BROWN WELL GRADED SAND WITH COARSE GRAVEL AND SOME SILT

1

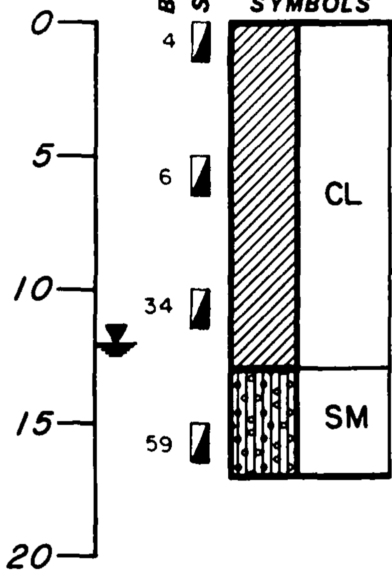
AUGER REFUSAL

BORING COMPLETED AT A DEPTH OF 19.0 FEET ON 11/17/86.
WATER ENCOUNTERED AT A DEPTH OF 15.0 FEET WHILE DRILLING.

BORING GW3-A

SURFACE ELEVATION 1420.84

DEPTH IN FEET | BLOW COUNTS | SAMPLES | 11/26/86 SYMBOLS | DESCRIPTIONS | OVA READING ppm



BROWN SILTY CLAY, SOME SAND AND GRAVEL, OCCASIONAL COBBLES AND BOULDERS

0

0

BROWN SILTY SAND, TRACE GRAVEL

0

AUGER REFUSAL

BORING COMPLETED AT A DEPTH OF 17.0 FEET ON 11/26/86.
WATER ENCOUNTERED AT A DEPTH OF 12.0 FEET WHILE DRILLING.

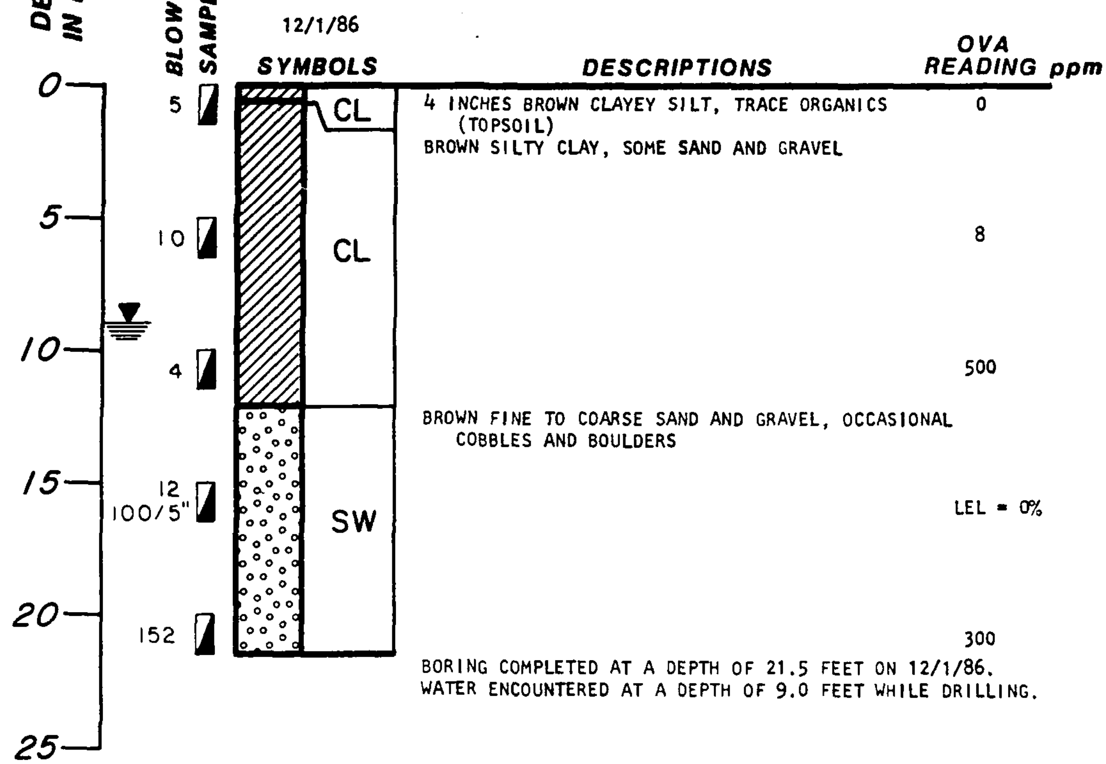
NOTE: PILOT BOREHOLE DRILLED APPROXIMATELY 6.0 FEET SOUTH OF GW3-A. HOLE ABANDONED AFTER HITTING A BOULDER AT 12.5 FEET.

LOG OF BORINGS

Dames & Moore

BORING GW3-B

SURFACE ELEVATION 1418.48



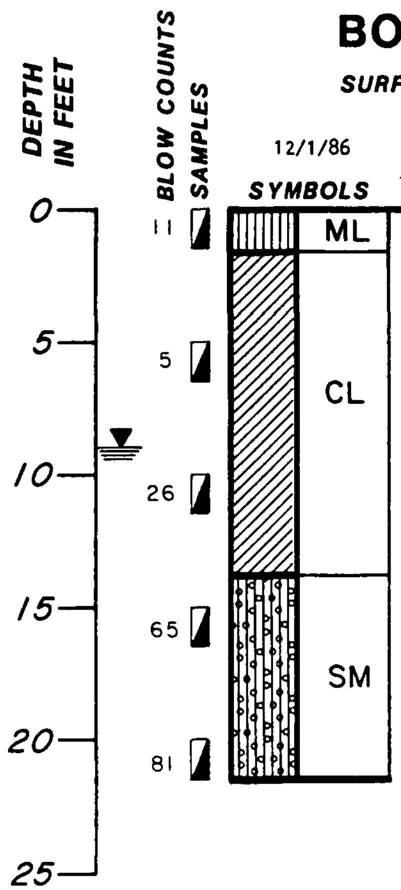
LOG OF BORINGS

Dames & Moore

BORING GW3-C

SURFACE ELEVATION 1417.59

12/1/86



DESCRIPTIONS	OVA READING ppm
BROWN CLAYEY SILT, TRACE ORGANICS (TOPSOIL)	0
BROWN SANDY CLAY, SOME SILT AND GRAVEL	
	0
BROWN SILTY SAND, SOME GRAVEL	
	2

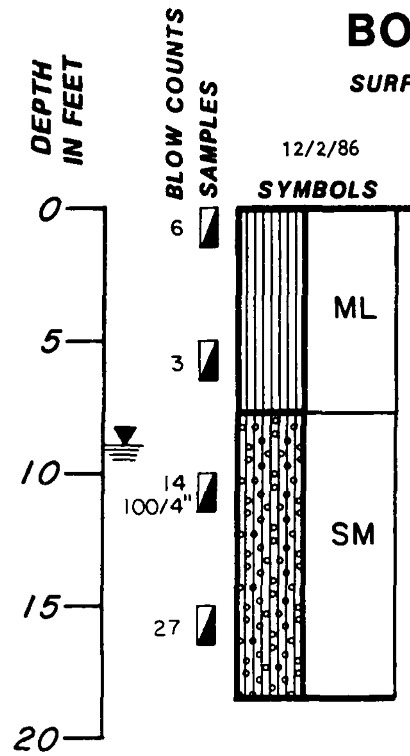
BORING COMPLETED AT A DEPTH OF 21.5 FEET ON 12/1/86.
WATER ENCOUNTERED AT A DEPTH OF 9.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

BORING GW3-D

SURFACE ELEVATION 1415.80



DESCRIPTIONS — ***OVA* READING ppm***

BROWN SILT, TRACE SAND

BROWN SILTY SAND, TRACE GRAVEL OCCASIONAL COBBLES AND BOULDERS

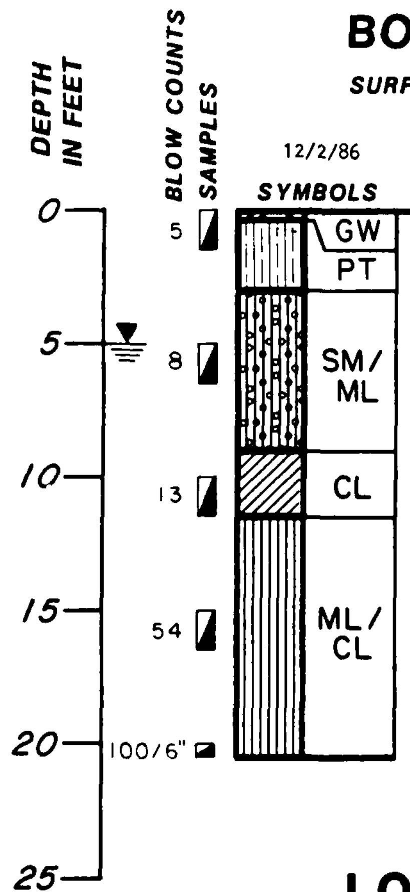
OCCASIONAL CLAY SEAMS — 1000

AUGER REFUSAL
BORING COMPLETED AT A DEPTH OF 18.5 FEET ON 12/2/86.
WATER ENCOUNTERED AT A DEPTH OF 9.0 FEET WHILE DRILLING

NOTE: * OVA MAY NOT HAVE BEEN FUNCTIONING PROPERLY.

BORING GW4-A

SURFACE ELEVATION 1410.14



DESCRIPTIONS — ***OVA READING ppm***

4 INCHES SAND AND GRAVEL (FILL) — 0

DARK BROWN PEAT, ORGANICS MIXED WITH SILT AND CLAY

BROWN SILTY SAND, SOME GRAVEL

GRAY SILTY CLAY, SOME SAND — 40

BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL

GRADES TO SILTY CLAY — 2

BORING COMPLETED AT A DEPTH OF 20.5 FEET ON 12/2/86.
WATER ENCOUNTERED AT A DEPTH OF 5.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

BORING GW4-B

SURFACE ELEVATION 1409.48

12/3/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	4	PT	DARK BROWN PEAT, ORGANICS MIXED WITH SILT AND CLAY	0
5	10	CL	GRAYISH-BROWN SILTY CLAY	
		SM/ ML	BROWN SILTY CLAY, SOME CLAY, TRACE OF GRAVEL	
10	16			
		ML/ CL	BROWN CLAYEY SILT, SOME SAND AND GRAVEL	
15	55			0
20	24		GRADES TO SILTY CLAY	
25				

BORING COMPLETED AT A DEPTH OF 21.5 FEET ON 12/3/86.
WATER ENCOUNTERED AT A DEPTH OF 6.0 FEET WHILE DRILLING.

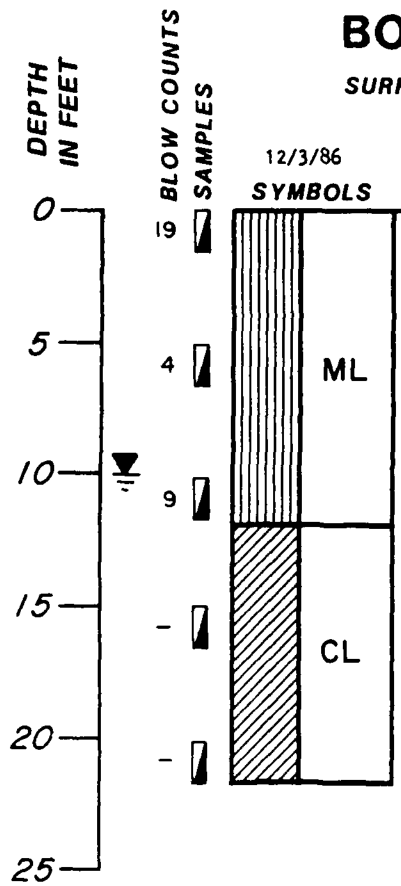
LOG OF BORINGS

Dames & Moore

BORING GW4-C

SURFACE ELEVATION 1413.10

12/3/86



DESCRIPTIONS	OVA READING ppm
TAN CLAYEY SILT AND GRAVEL, FILL TO APPROXIMATELY 2 FEET	100
GRADES WITH SOME SAND	0
BROWN SILTY CLAY, SOME GRAVEL	
	150
GRADES WITH LESS SILT	

BORING COMPLETED AT A DEPTH OF 21.5 FEET ON 12/3/86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

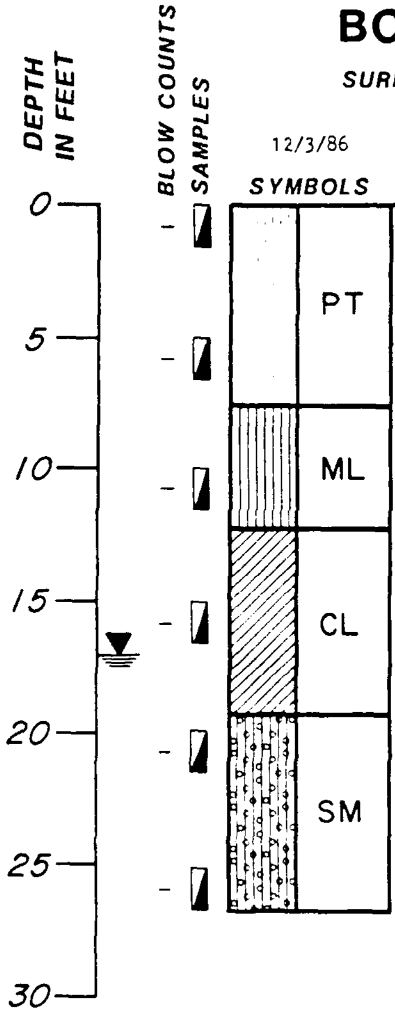
LOG OF BORINGS

Dames & Moore

BORING GW4-D

SURFACE ELEVATION 1413.92

12/3/86



DESCRIPTIONS		OVA READING ppm
DARK BROWN PEAT, ORGANICS MIXED WITH SILT AND CLAY		150
		0
GRAY SILT		
	FUEL ODOR	500
TAN CLAY		
	FUEL ODOR	
DARK BROWN SANDY SILT		
	FUEL ODOR	

BORING COMPLETED AT A DEPTH OF 26.5 FEET ON 12/3/86.
WATER ENCOUNTERED AT A DEPTH OF 17.0 FEET WHILE DRILLING.

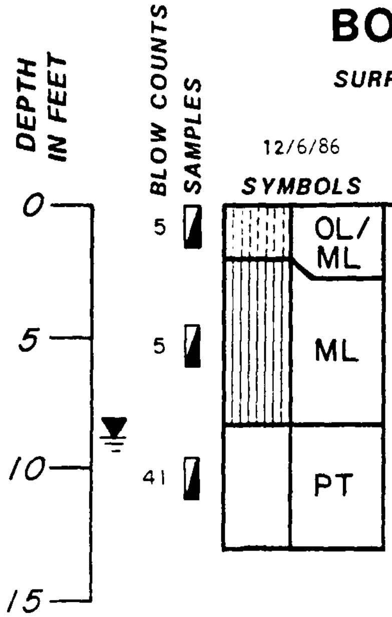
LOG OF BORINGS

Dames & Moore

BORING GW8-A

SURFACE ELEVATION 1411.96

12/6/86



DESCRIPTIONS	OVA READING ppm
DARK BROWN SILT, SOME CLAY, TRACE ORGANICS (TOPSOIL)	0
BROWN CLAYEY SILT, TRACE SAND	0
DARK BROWN PEAT, ORGANICS MIXED WITH SILT, CLAY, AND SAND	0

AUGER REFUSAL

BORING COMPLETED AT A DEPTH OF 13.0 FEET ON 12/6/86.
WATER ENCOUNTERED AT A DEPTH OF 9.0 FEET WHILE DRILLING.

NOTE: PILOT BOREHOLE DRILLED 5.0 FEET EAST OF GW8-A. AUGER REFUSAL AT 13.0 FEET.

PILOT BOREHOLE DRILLED 13.0 FEET EAST OF GW8-A. AUGER BROKE OFF, 5.0 FOOT STRING LOST AT DEPTH OF 15.0 FEET.

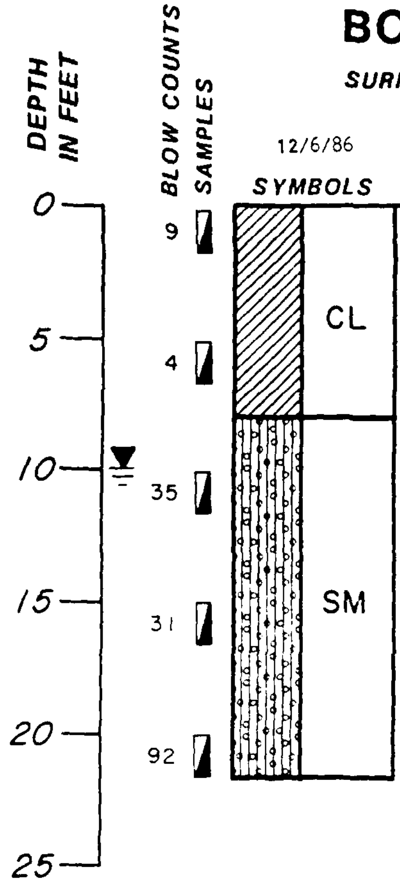
LOG OF BORINGS

Dames & Moore

BORING GW8-B

SURFACE ELEVATION 1411.50

12/6/86



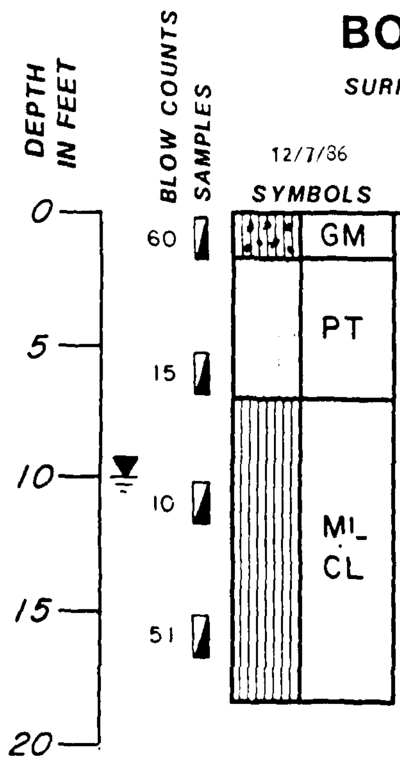
DESCRIPTIONS	OVA READING ppm
BROWN SILTY CLAY, SOME SAND AND GRAVEL	0
	0
BROWN SILTY FINE TO MEDIUM SAND, SOME GRAVEL	3
	100

BORING COMPLETED AT A DEPTH OF 21.5 FEET ON 12/6/86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

BORING GW8-C

SURFACE ELEVATION 1412.80

12/7/86



DESCRIPTIONS	OVA READING ppm
BROWN SILTY SANDY GRAVEL (FILL)	0
BROWN PEAT, ORGANICS MIXED WITH SILT, CLAY, SAND, AND GRAVEL	40
BROWN CLAYEY SILT, SOME SAND AND GRAVEL, SOME COBBLES AND BOULDERS	2
	2

AUGER REFUSAL
BORING COMPLETED AT A DEPTH OF 18.0 FEET ON 12/7/86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

NOTE: PILOT BOREHOLE DRILLED APPROXIMATELY 5.0 FEET EAST OF GW8-C. BOREHOLE WAS ABANDONED BECAUSE OF AUGER REFUSAL.

LOG OF BORINGS

Dames & Moore

BORING GW10-A

SURFACE ELEVATION 1407.90

12/11/86

DEPTH IN FEET	BLOW COUNTS / SAMPLES	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	2	PT	1.5 INCHES DARK BROWN SILT WITH ROOTLETS DARK BROWN PEAT	4
5	2			
		ML-CL	BROWN SILT WITH CLAY AND FINE SAND	
10	18			
15	46		WITH COARSE GRAVEL	6
20				

BORING COMPLETED AT A DEPTH OF 20.0 FEET ON 12/11/86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

BORING GW10-B

SURFACE ELEVATION 1408.02

12/11/86

DEPTH IN FEET	BLOW COUNTS / SAMPLES	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	4	ML/CL	ORANGE-BROWN CLAYEY SILT, SOME SAND, SOME COBBLES, BOULDERS	2
5	29			0
		SM	BROWN SILTY FINE TO COARSE SAND AND GRAVEL	
10	16 100/2"			0
			AUGER REFUSAL	
15				

BORING COMPLETED AT A DEPTH OF 13.0 FEET ON 12/11/86.
WATER ENCOUNTERED AT A DEPTH OF 8.0 FEET WHILE DRILLING.

NOTE: PILOT BOREHOLES WERE DRILLED APPROXIMATELY 4.0 FEET SOUTH, 4.0 FEET SOUTH AND 20.0 FEET EAST, AND 8.0 FEET SOUTH AND 20.0 FEET EAST. BOREHOLES WERE ABANDONED BECAUSE OF AUGER REFUSAL.

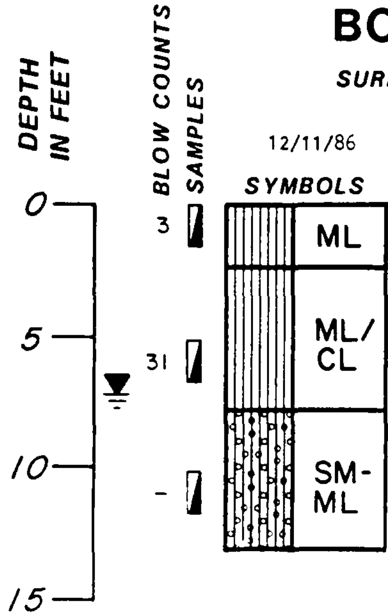
LOG OF BORINGS

Dames & Moore

BORING GW10-C

SURFACE ELEVATION 1405.73

12/11/86



DESCRIPTIONS	OVA READING ppm
BROWN CLAYEY SILT, TRACE ORGANICS (TOPSOIL)	0
ORANGE-BROWN CLAYEY SILT, SOME SAND AND GRAVEL	--
BROWN SANDY SILT, SOME COBBLES, BOULDERS, TRACE CLAY AND GRAVEL	0
AUGER REFUSAL	

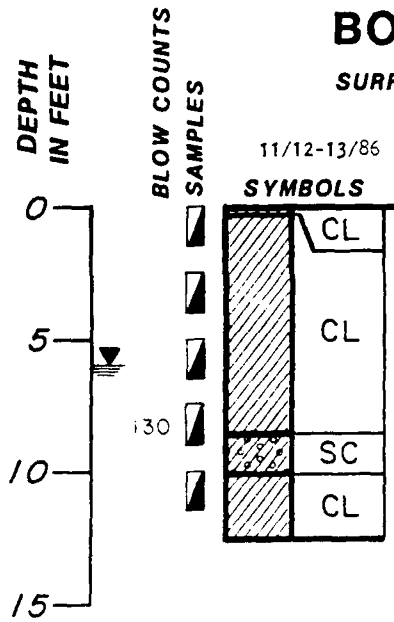
BORING COMPLETED AT A DEPTH OF 13.0 FEET ON 12/11/86.
WATER ENCOUNTERED AT A DEPTH OF [illegible].0 FEET WHILE DRILLING.

LOG OF BORINGS **Dames & Moore**

BORING B2-B

SURFACE ELEVATION NA

11/12-13/86



DESCRIPTIONS	OVA READING ppm
2 INCHES DARK BROWN SANDY CLAY, TRACE ORGANICS (TOPSOIL)	
REDDISH-BROWN SANDY CLAY, TRACE GRAVEL	
REDDISH-BROWN CLAYEY COARSE SAND	
REDDISH-BROWN SANDY CLAY, TRACE GRAVEL	

BORING COMPLETED AT A DEPTH OF 12.5 FEET ON 11/13/86.
WATER ENCOUNTERED AT A DEPTH OF 5.0 FEET WHILE DRILLING.
OVA METER OUT OF GAS.

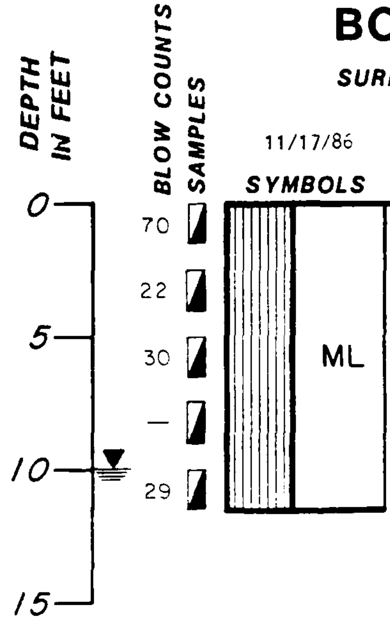
LOG OF BORINGS

Dames & Moore

BORING B2-C

SURFACE ELEVATION NA

11/17/86



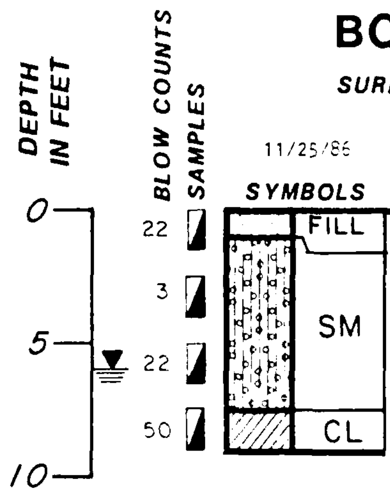
DESCRIPTIONS	OVA READING ppm
BROWN CLAYEY SILT AND GRAVEL	50
	10
	1000

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 11/12/86.
WATER ENCOUNTERED AT A DEPTH OF 10.0 FEET WHILE DRILLING.

BORING B3-A

SURFACE ELEVATION NA

11/25/86



DESCRIPTIONS	OVA READING ppm
BROWN SILTY MEDIUM TO COARSE SAND AND GRAVEL, OCCASIONAL SILTY CLAY SEAM (FILL)	200
	40
BROWN AND GRAY SANDY CLAY, SOME GRAVEL	1000

BORING COMPLETED AT A DEPTH OF 9.0 FEET ON 11/25/86.
WATER ENCOUNTERED AT A DEPTH OF 6.0 FEET WHILE DRILLING.

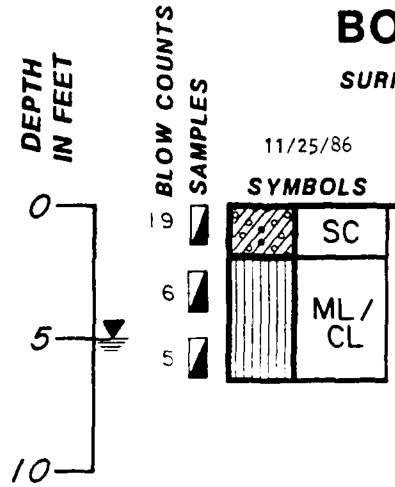
LOG OF BORINGS

Dames & Moore

BORING B3-B

SURFACE ELEVATION NA

11/25/86



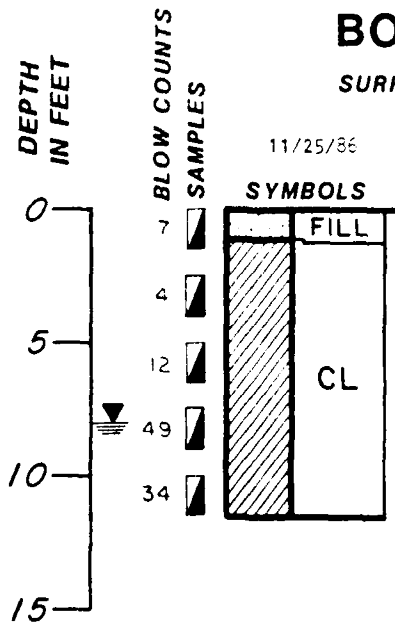
DESCRIPTIONS	OVA READING ppm
BROWN CLAYEY MEDIUM TO COARSE SAND AND GRAVEL, SOME SILT (FILL)	
BROWN CLAYEY SILT, SOME SAND, TRACE GRAVEL	600
GRADES TO SILTY CLAY	800 - 1000

BORING COMPLETED AT A DEPTH OF 6.5 FEET ON 11/25/86.
WATER ENCOUNTERED AT A DEPTH OF 5.0 FEET WHILE DRILLING.

BORING B3-C

SURFACE ELEVATION NA

11/25/86



DESCRIPTIONS	OVA READING ppm
BROWN SANDY CLAY, SOME GRAVEL (FILL)	30
GRADES TO SANDY SILTY CLAY	5
	2

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 11/25/86.
WATER ENCOUNTERED AT A DEPTH OF 8.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

BORING B4-A

SURFACE ELEVATION NA

12/2/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	2	PT	DARK BROWN PEAT, ORGANICS MIXED WITH SILTY CLAY	
	2			6
5	2			
	3	CL	GRAY AND BROWN MOTTLED CLAY	
10	-			4
15				

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 12/2/86.
WATER ENCOUNTERED AT A DEPTH OF 5.0 FEET WHILE DRILLING.

BORING B4-B

SURFACE ELEVATION NA

12/2/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	2	CL	DARK BROWN SILTY CLAY	800
	2			
5	16		GRADES TO TAN	
	-	SP	BROWN SAND AND GRAVEL	800
10	-	CL	BROWN SILTY CLAY, SOME SAND AND GRAVEL	
15				

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 12/2/86.
WATER ENCOUNTERED AT A DEPTH OF 8.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

BORING B4-C

SURFACE ELEVATION NA

12/4/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	100/3"	CL/GP	TAN SILTY CLAY AND GRAVEL, SOME SILT (FILL)	0
	6	SM	3 INCHES, GRAVELLY SILTY SAND	
5	10	CL	BROWN SILTY CLAY, TRACE GRAVEL	10
	10			
10				

BORING COMPLETED AT A DEPTH OF 9.0 FEET ON 12/4/86.
WATER ENCOUNTERED AT A DEPTH OF 3.0 FEET WHILE DRILLING.

BORING B4-D

SURFACE ELEVATION NA

12/4/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	9	ML	TAN CLAYEY SILT, SOME SAND AND GRAVEL (FILL)	0
	4	SM	2 INCHES, GRAY SILTY CLAYEY SAND	
5	4	PT	DARK BROWN PEAT, ORGANICS MIXED WITH SILT	500
	7		SLIGHT FUEL ODOR	
10	-	ML	BROWN CLAYEY SILT, SOME SAND	500 LEL = 20%
15				

BORING COMPLETED AT A DEPTH OF 11.5 FEET
ON 12/4/86.
WATER ENCOUNTERED AT A DEPTH OF 7.5 FEET WHILE DRILLING.

BORING B4-E

SURFACE ELEVATION NA

12/5/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	79	GM	TAN SILTY FINE TO COARSE SAND AND GRAVEL (FILL)	200 LEL = 10%
	23	SM	TAN FINE TO COARSE SILTY SAND AND GRAVEL (FILL) GRADES WITH LESS GRAVEL	
5	-			200 LEL = 60
10				

BORING COMPLETED AT A DEPTH OF 6.5 FEET ON 12/5/86.
WATER ENCOUNTERED AT A DEPTH OF 5.5 FEET WHILE DRILLING.

NOTE: PILOT BOREHOLE DRILLED APPROXIMATELY 20.0 FEET NORTH OF B4-E. HOLE WAS ABANDONDED AFTER RECORDING A LEL OF 75%.

LOG OF BORINGS

Dames & Moore

BORING B-8A

SURFACE ELEVATION NA

12/5/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	23	SM/ML	BROWN SILTY CLAY, SOME GRAVEL	0
	15		GRADES TO SANDY SILT	
5		CL	BROWN SILTY CLAY, TRACE SAND AND GRAVEL	
	16			0
	20			
10	26			
15				

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 12/5/86.
NO GROUND WATER ENCOUNTERED WHILE DRILLING.

NOTE: PILOT BOREHOLE DRILLED APPROXIMATELY 20.0 FEET SOUTH OF B8-A. HOLE WAS ABANDONED AFTER RECORDING A READING OF <1,000ppm ON THE OVA AT A DEPTH OF 2.0 FEET.

BORING B8-B

SURFACE ELEVATION NA

12/6/86

DEPTH IN FEET	BLOW COUNTS	SYMBOLS	DESCRIPTIONS	OVA READING ppm
0	25	ML	TAN CLAYEY SILT, TRACE SAND AND GRAVEL	0
	19	CL	BROWN SILTY CLAY, SOME SAND AND GRAVEL	0
5	12	PT	BROWN PEAT. ORGANICS MIXED WITH CLAY, SILT, AND SAND	200
	24	ML/CL	DARK BROWN TO BROWN CLAYEY SILT, SOME SAND AND GRAVEL	LEL 20%
10	-			
15				

BORING COMPLETED AT A DEPTH OF 11.5 FEET ON 12/6/86.
WATER ENCOUNTERED AT A DEPTH OF 8.0 FEET WHILE DRILLING.

LOG OF BORINGS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1435.06

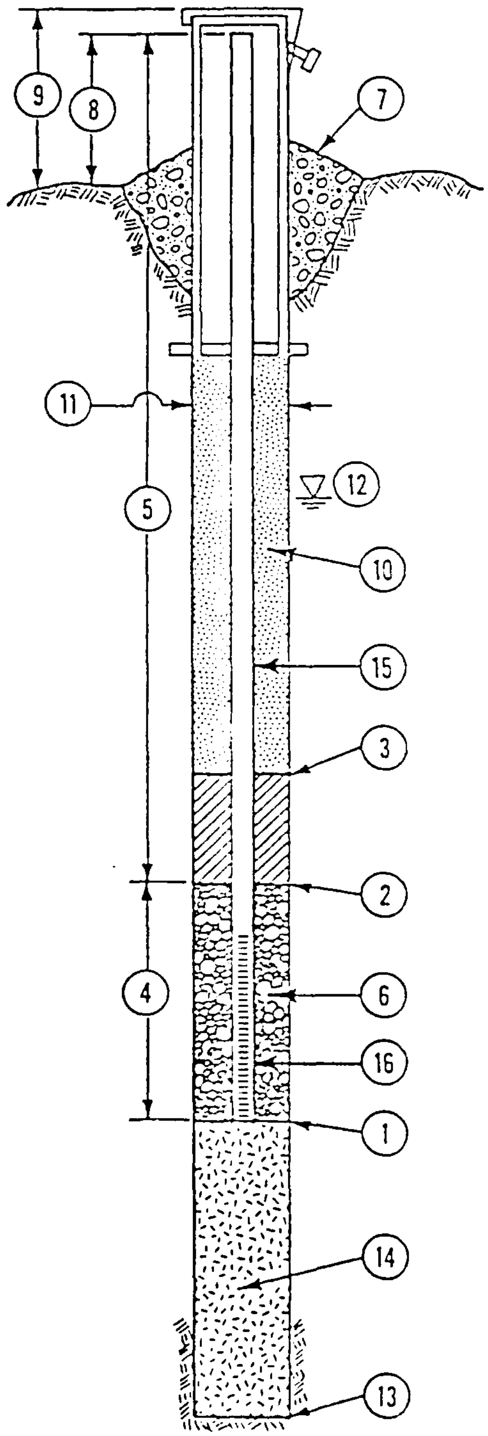
TOP OF WELL CASING ELEVATION 1437.67

JOB NUMBER 1016-267

BORING NUMBER GW2-A

DATE 11/13/86

LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 11.5 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) ______ FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) ______ FEET.*
4. LENGTH OF WELL SCREEN 10.0 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 14.11 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.61 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ______ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL —.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 2.5 FEET.*
13. TOTAL DEPTH OF BOREHOLE 12.5 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1433.84

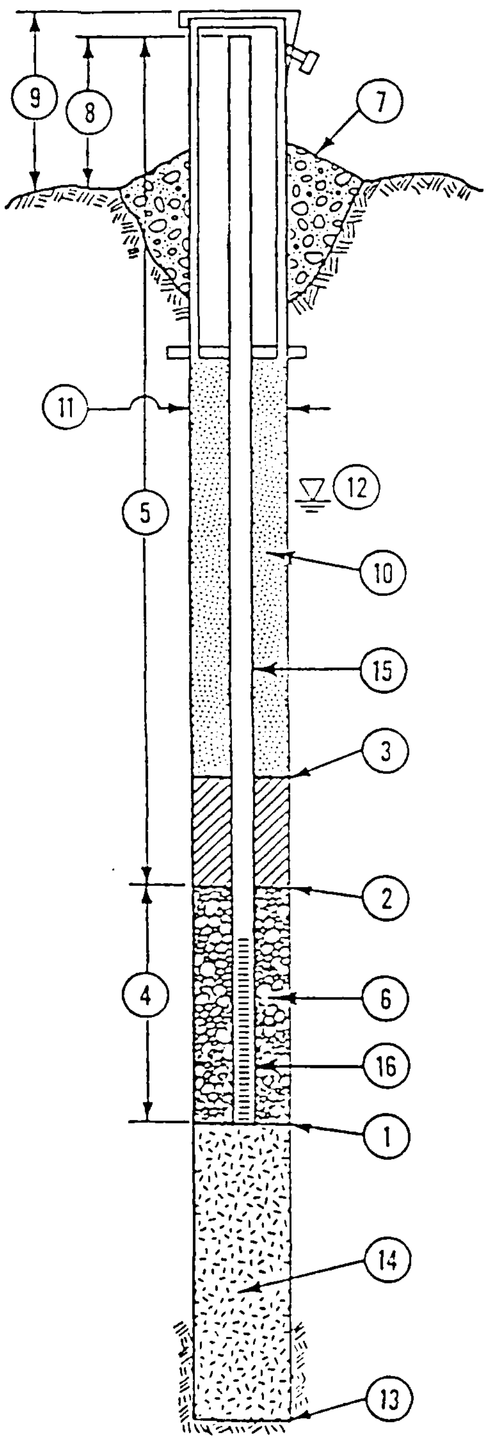
TOP OF WELL CASING ELEVATION 1436.25

JOB NUMBER 1016-267

BORING NUMBER GW-2B

DATE 11/14/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 12.5 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 2.5 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 14.91 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.41 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ______ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL Grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 2.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 15.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless Steel
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1436.17

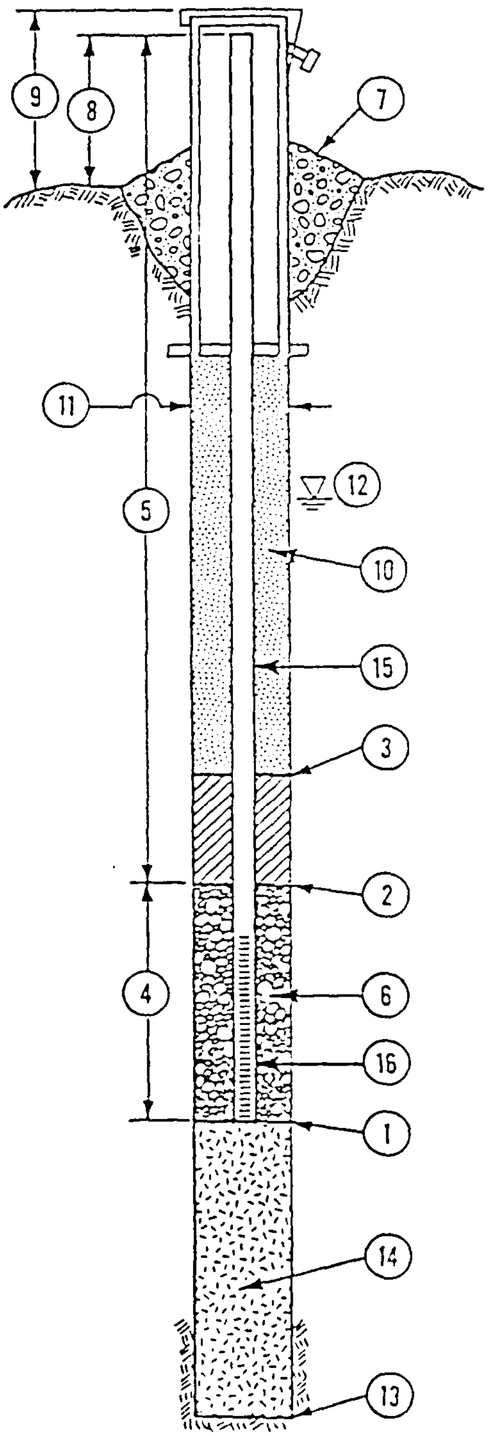
TOP OF WELL CASING ELEVATION 1438.55

JOB NUMBER 1016-267

BORING NUMBER GW-2C

DATE 11/14/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 21.5 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 6.5 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 4.5 FEET.*
4. LENGTH OF WELL SCREEN 15 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 23.88 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.38 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ______ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 6.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 21.5 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1427.78

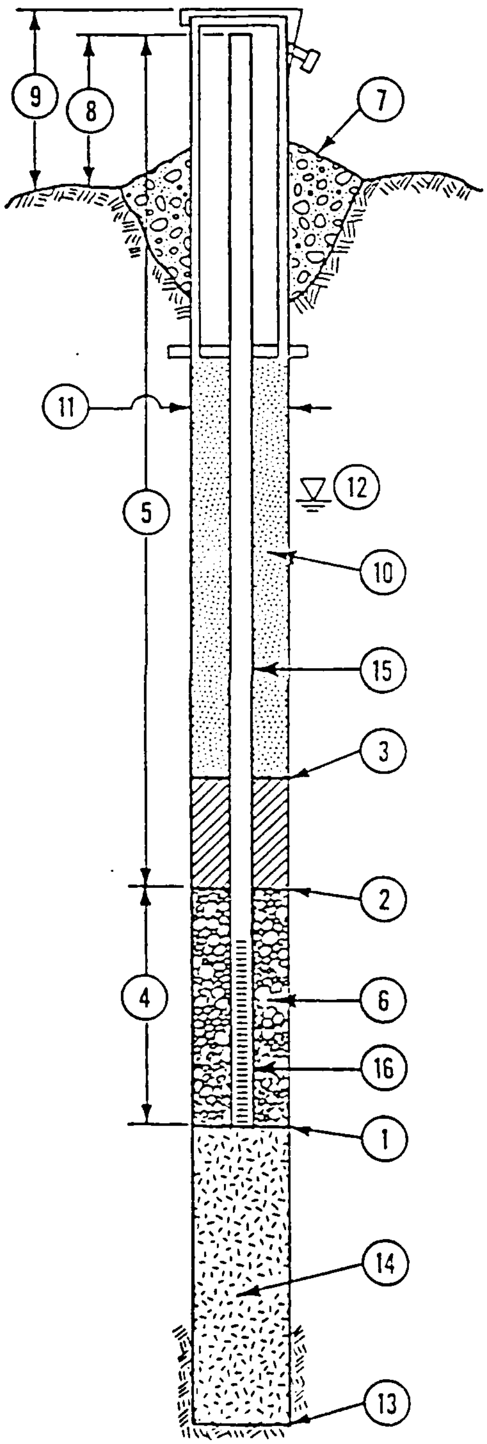
TOP OF WELL CASING ELEVATION 1429.55

JOB NUMBER 1016-267

BORING NUMBER GW2-D

DATE 11/17/86

LOCATION Duluth IAP, MN



(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 22.5 FEET.*

(2) DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 6.5 FEET.*

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 4.5 FEET.*

(4) LENGTH OF WELL SCREEN 15 FEET. SLOT SIZE 0.010.

(5) TOTAL LENGTH OF PIPE 24.27 FEET AT 2 INCH DIAMETER.

(6) TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.

(7) CONCRETE CAP. YES NO (CIRCLE ONE)

(8) HEIGHT OF WELL CASING ABOVE GROUND 1.77 FEET.

(9) PROTECTIVE CASING? YES NO (CIRCLE ONE)
HEIGHT ABOVE GROUND ______ FEET.
LOCKING CAP? YES NO (CIRCLE ONE)

(10) TYPE OF UPPER BACKFILL Grout.

(11) BOREHOLE DIAMETER 5 INCHES.

(12) DEPTH TO GROUND WATER 10.0 FEET.*

(13) TOTAL DEPTH OF BOREHOLE 23.0 FEET.*

(14) TYPE OF LOWER BACKFILL —.

(15) PIPE MATERIAL stainless steel

(16) SCREEN MATERIAL stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1426.25

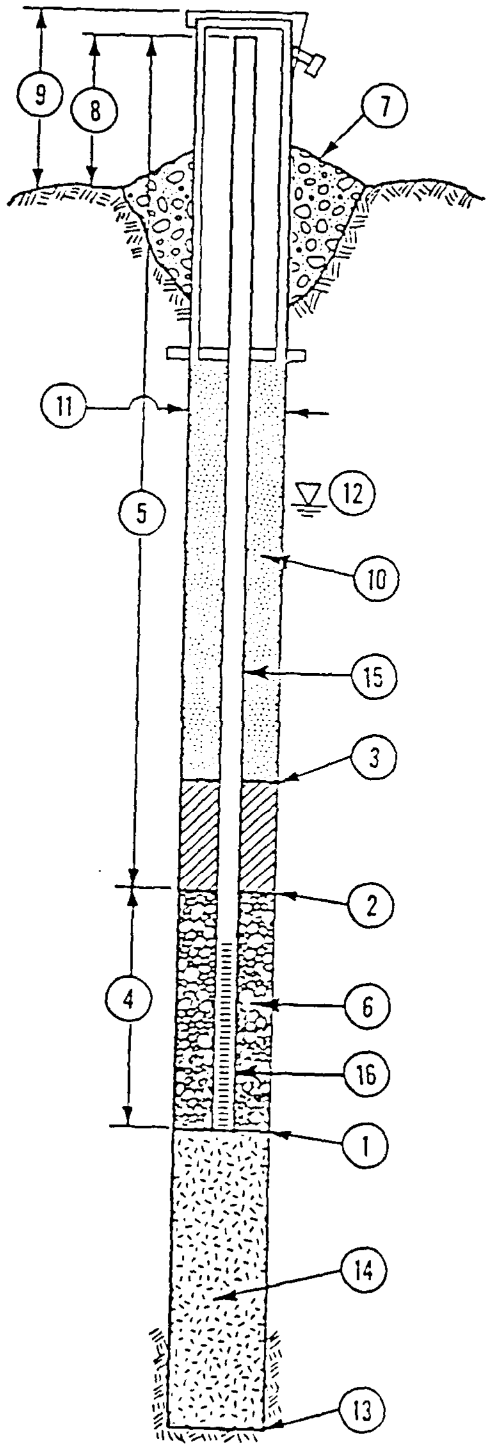
TOP OF WELL CASING ELEVATION 1427.18

JOB NUMBER 1016-267

BORING NUMBER GW-2E

DATE 11/17/86

LOCATION Duluth IAP, MN



(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 14.0 FEET.*

(2) DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 8.0 FEET.*

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 6.0 FEET.*

(4) LENGTH OF WELL SCREEN 10.0 FEET. SLOT SIZE 0.010.

(5) TOTAL LENGTH OF PIPE 19.93 FEET AT 2 INCH DIAMETER.

(6) TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.

(7) CONCRETE CAP. YES NO (CIRCLE ONE)

(8) HEIGHT OF WELL CASING ABOVE GROUND 0.93 FEET.

(9) PROTECTIVE CASING? YES NO (CIRCLE ONE)
HEIGHT ABOVE GROUND ______ FEET.
LOCKING CAP? YES NO (CIRCLE ONE)

(10) TYPE OF UPPER BACKFILL grout.

(11) BOREHOLE DIAMETER 5 INCHES.

(12) DEPTH TO GROUND WATER 10.79 FEET.*

(13) TOTAL DEPTH OF BOREHOLE 19.0 FEET.*

(14) TYPE OF LOWER BACKFILL —.

(15) PIPE MATERIAL Stainless Steel

(16) SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1421.25

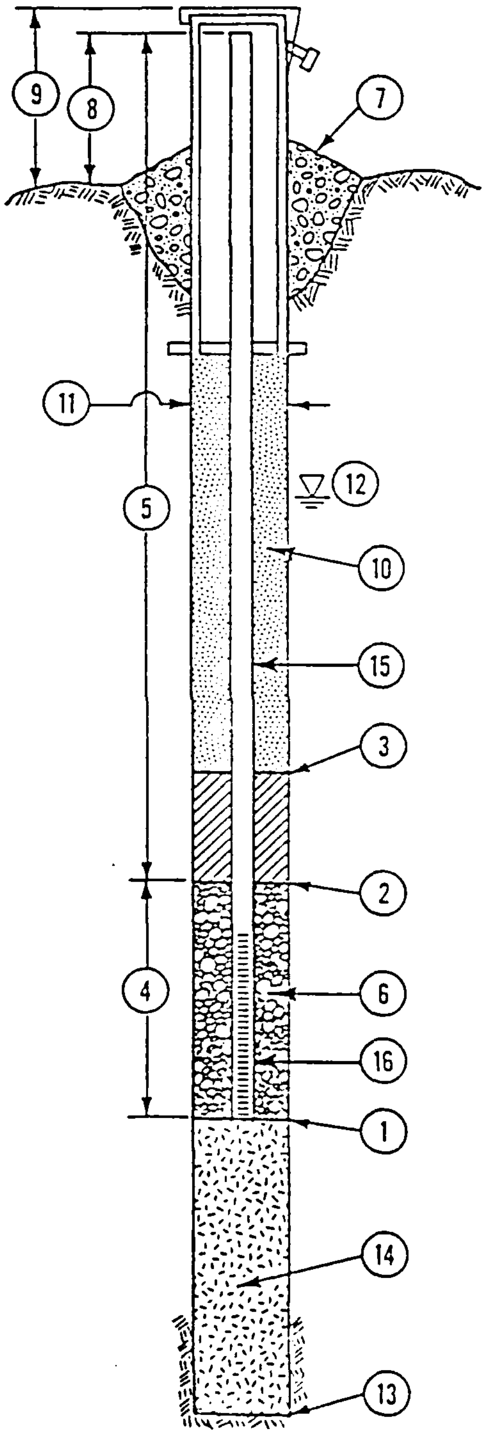
TOP OF WELL CASING ELEVATION 1423.84

JOB NUMBER 1016-267

BORING NUMBER GW3-1

DATE 11/26/96

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 16.5 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 5.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 3.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 19.09 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.59 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ____ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL Grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER ~12.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 17.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless Steel
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1418.92

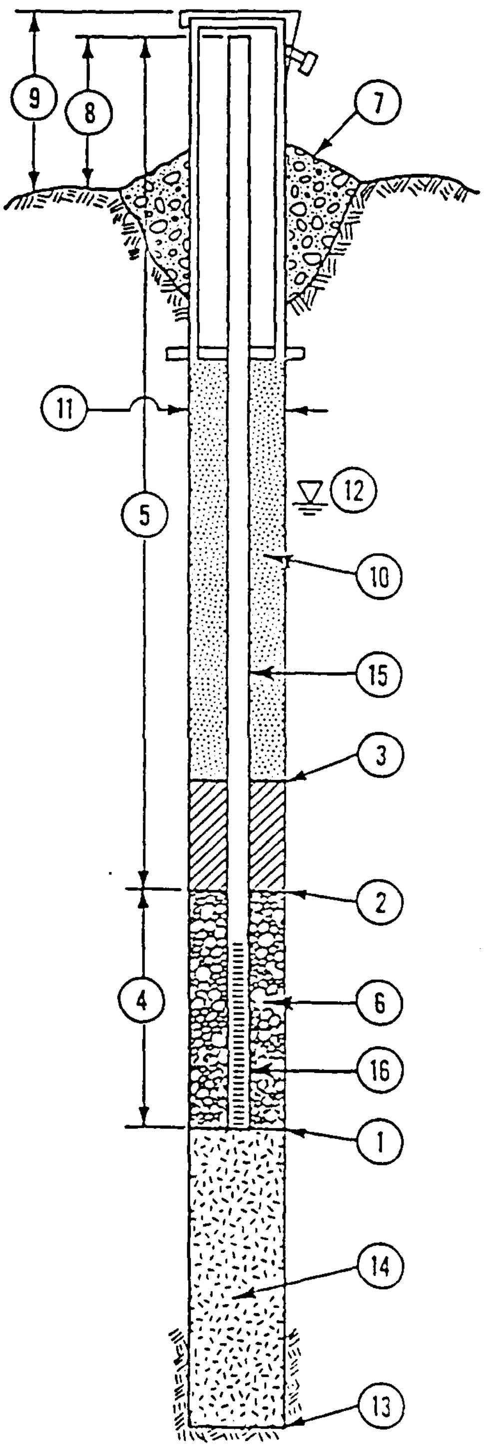
TOP OF WELL CASING ELEVATION 1421.25

JOB NUMBER 1016-267

BORING NUMBER GW3-B

DATE 12/1/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 4.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
4. LENGTH OF WELL SCREEN 15.0 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.34 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.34 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ____ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 4.5 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1417.97

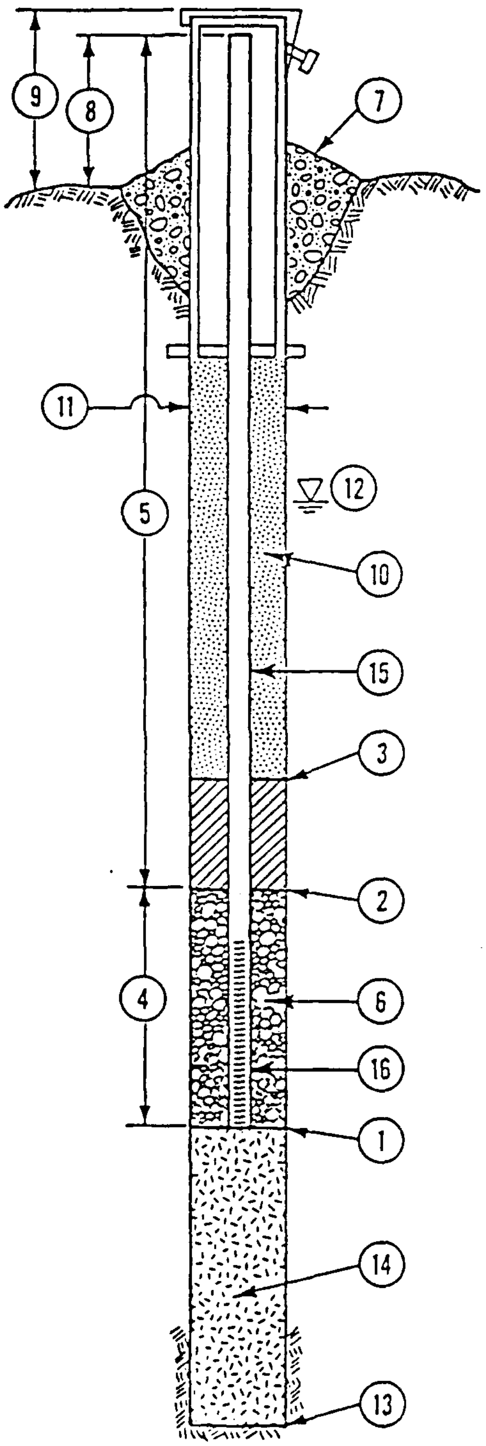
TOP OF WELL CASING ELEVATION 1419.59

JOB NUMBER 1016-267

BORING NUMBER GW3-C

DATE 12/1/86

LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 19.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 7.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 5.0 FEET.*
4. LENGTH OF WELL SCREEN 10.0 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 20.5 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 1.59 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ____ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL Grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 3.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 19.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL Stainless steel.

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1416.23

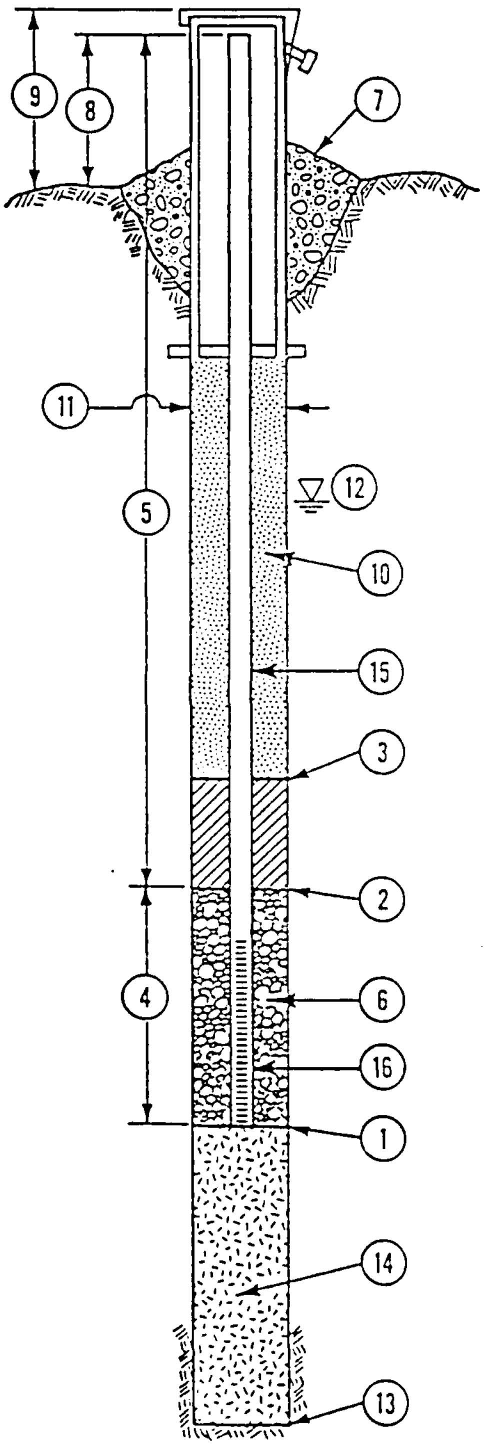
TOP OF WELL CASING ELEVATION 1417.59

JOB NUMBER 1016-267

BORING NUMBER GW3-D

DATE 12/12/86

LOCATION Duluth/AP, MN



(1) DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.90 FEET.*

(2) DEPTH TO BOTTOM OF SEAL (IF INSTALLED) ~3.0 FEET.*

(3) DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*

(4) LENGTH OF WELL SCREEN 15.0 FEET.
SLOT SIZE 0.010.

(5) TOTAL LENGTH OF PIPE 20.25 FEET AT 2 INCH DIAMETER.

(6) TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.

(7) CONCRETE CAP. YES NO (CIRCLE ONE)

(8) HEIGHT OF WELL CASING ABOVE GROUND 1.35 FEET.

(9) PROTECTIVE CASING? YES NO (CIRCLE ONE)
HEIGHT ABOVE GROUND ____ FEET.
LOCKING CAP? YES NO (CIRCLE ONE)

(10) TYPE OF UPPER BACKFILL Grout.

(11) BOREHOLE DIAMETER 5 INCHES.

(12) DEPTH TO GROUND WATER 3.41 FEET.*

(13) TOTAL DEPTH OF BOREHOLE 18.9 FEET.*

(14) TYPE OF LOWER BACKFILL —.

(15) PIPE MATERIAL Stainless Steel

(16) SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1410.68

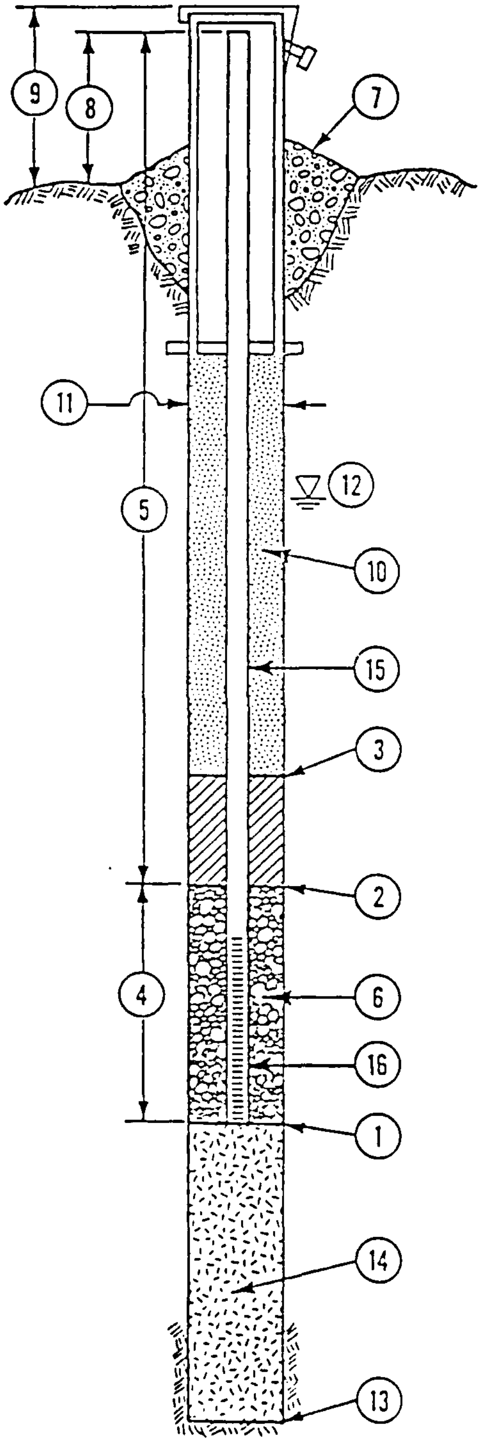
TOP OF WELL CASING ELEVATION 1413.27

JOB NUMBER 1016-267

BORING NUMBER GW4-A

DATE 12-12/96

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 4 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2 FEET.*
4. LENGTH OF WELL SCREEN 15 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.59 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.59 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ______ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 2.01 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL ______.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1409.83

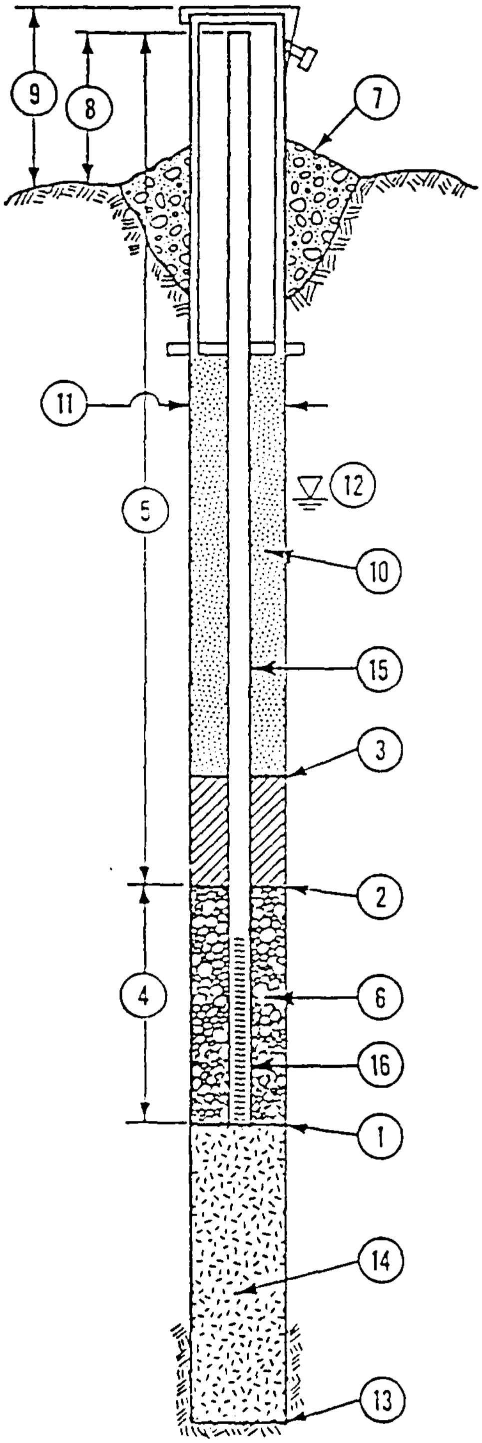
TOP OF WELL CASING ELEVATION 1412.25

JOB NUMBER 1016-267

BORING NUMBER GW4-B

DATE 12/3/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 4 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2 FEET.*
4. LENGTH OF WELL SCREEN 15 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.42 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.42 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ______ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL Sand.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 2.9 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL ——.
15. PIPE MATERIAL stainless steel
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1413.59

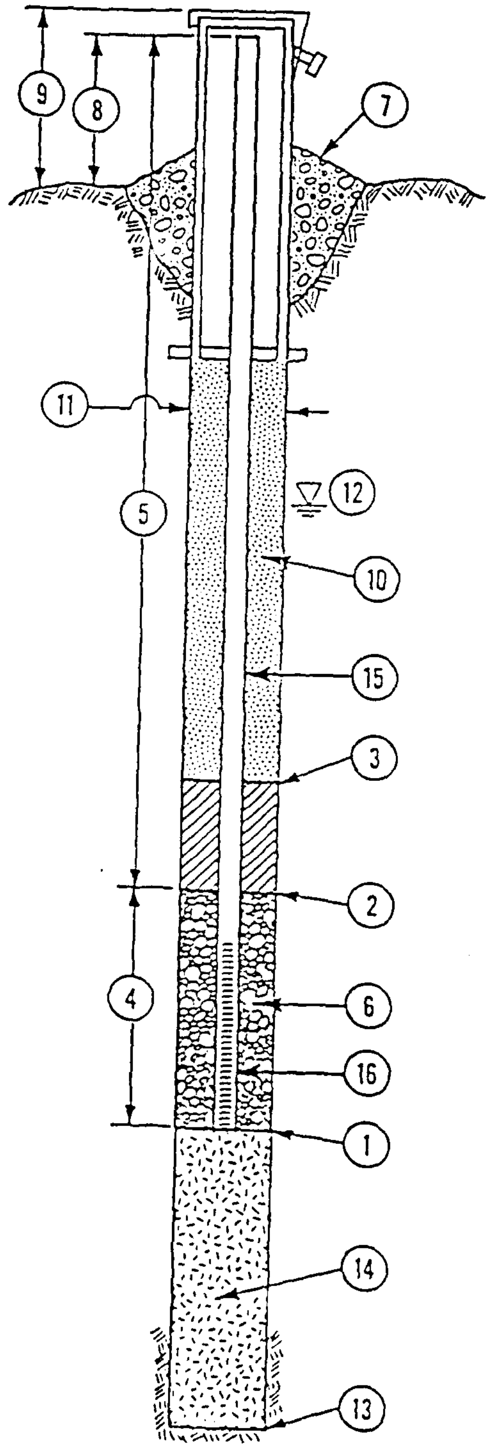
TOP OF WELL CASING ELEVATION 1416.29

JOB NUMBER 1016-267

BORING NUMBER GW4-C

DATE 12/3/86

LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 8.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 6.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.7 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.7 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ____ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 7.8 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL stainless steel.
16. SCREEN MATERIAL stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1414.62

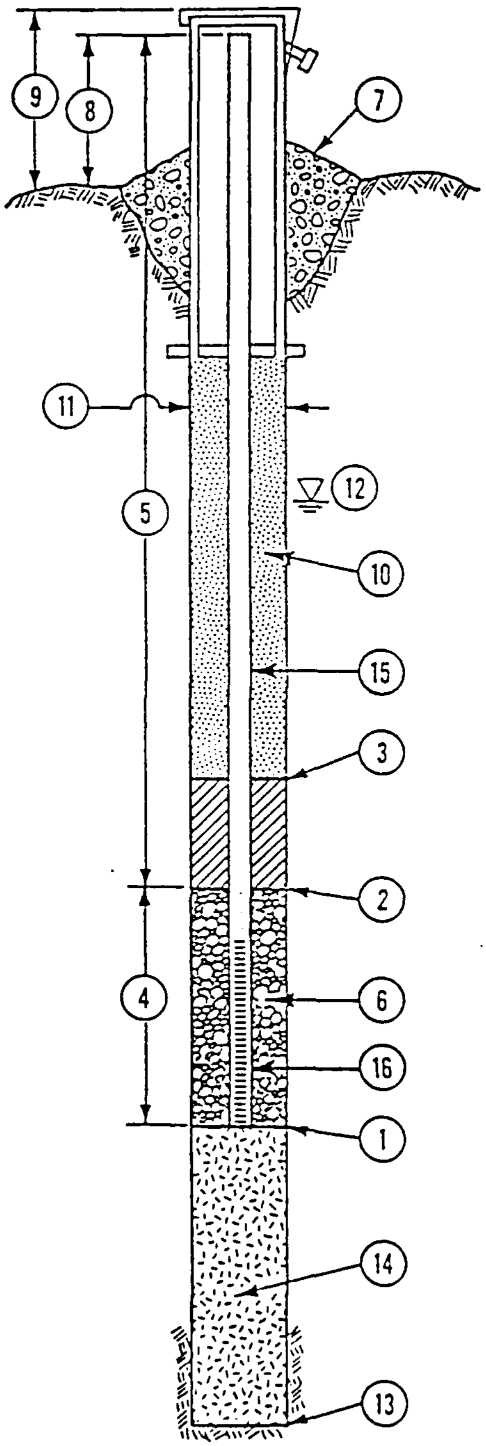
TOP OF WELL CASING ELEVATION 1417.17

JOB NUMBER 1016-267

BORING NUMBER GW4-D

DATE 12/3/86

LOCATION Delta, 1,90 MW



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 25.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 18.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 16.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 27.55 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.55 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ____ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL Grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 6.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 25.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless Steel
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1412.62

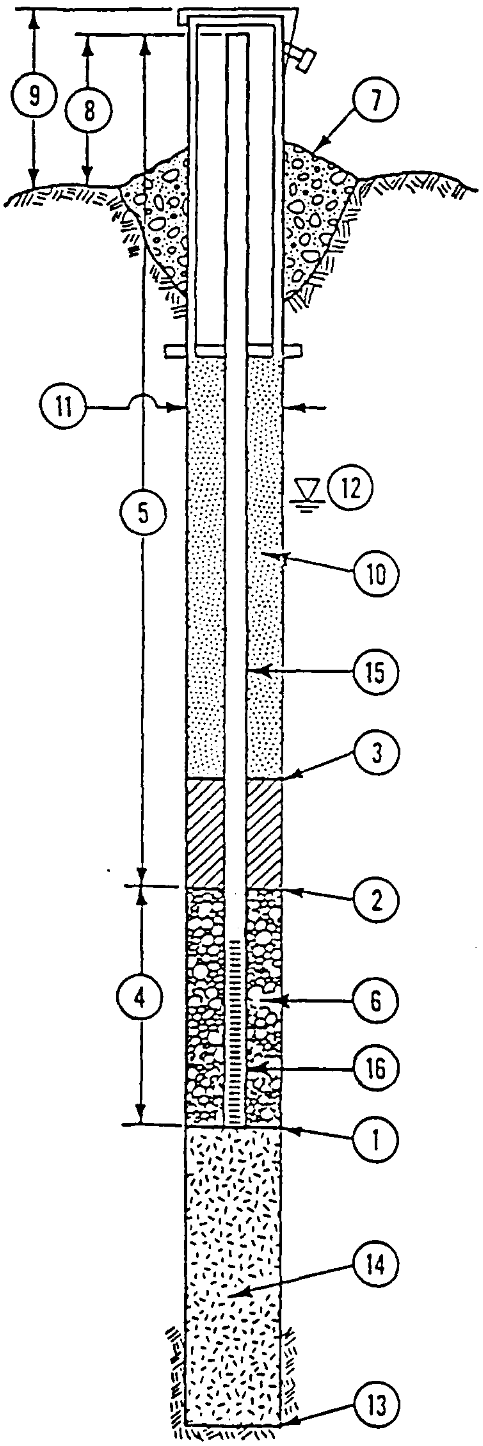
TOP OF WELL CASING ELEVATION 1414.36

JOB NUMBER G1016-267

BORING NUMBER GW8A

DATE 12/6/86

LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 13.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 2.6 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 14.74 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 1.74 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ____ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL —.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 3.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 13.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless Steel
16. SCREEN MATERIAL Stainless Steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1412.15

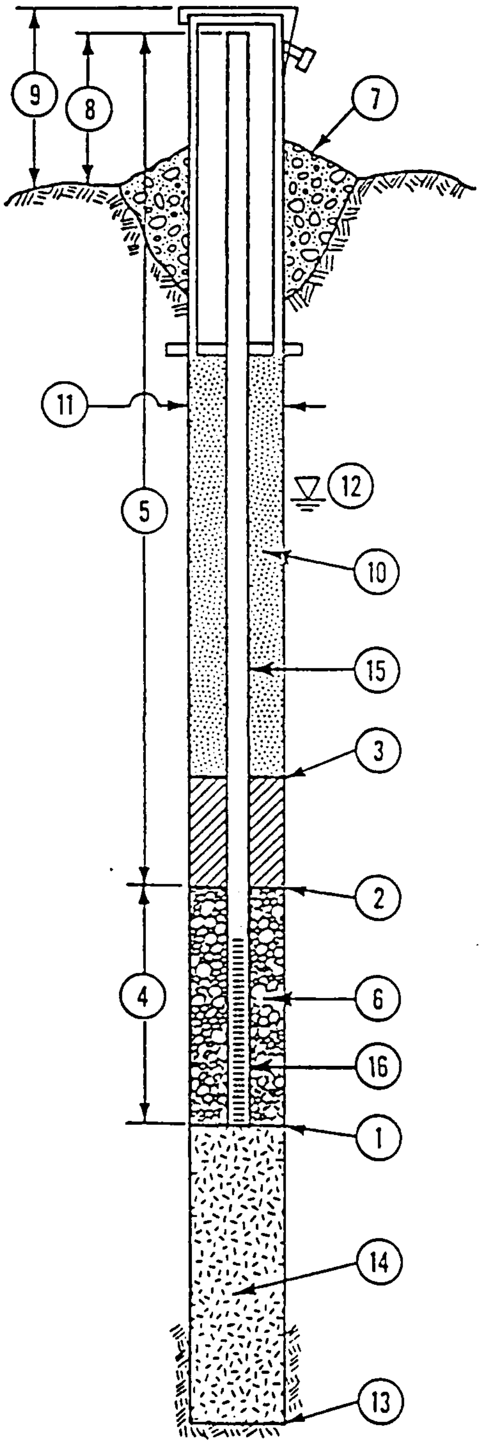
TOP OF WELL CASING ELEVATION 1414.96

JOB NUMBER 1016-267

BORING NUMBER GWE-B

DATE 12/6/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 20.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 8 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 6 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.81 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.81 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ______ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 2.95 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL Stainless steel.

*(DEPTH FROM GROUND SURFACE)

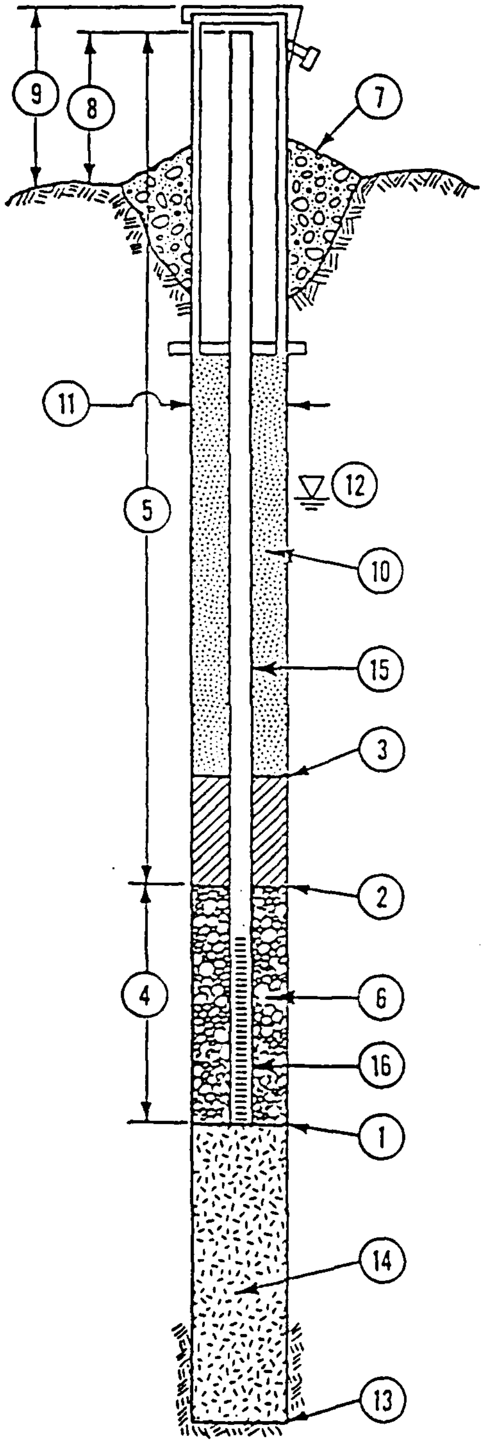
MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1413.22
TOP OF WELL CASING ELEVATION 1415.97

JOB NUMBER 1016-267
BORING NUMBER GW8C
DATE 12/7/86
LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 18.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 6 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 4 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 20.75 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.75 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ______ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER 3.6 FEET.*
13. TOTAL DEPTH OF BOREHOLE 18.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1407.90

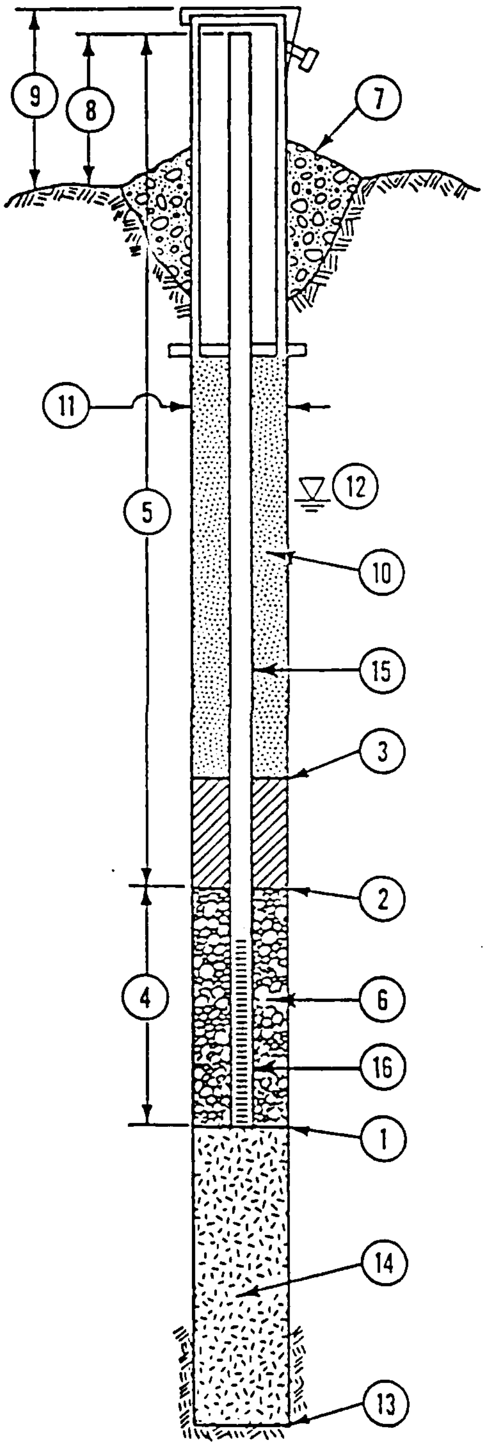
TOP OF WELL CASING ELEVATION 1411.06

JOB NUMBER 1016-267

BORING NUMBER GW10A

DATE 12/11/86

LOCATION Duluth ANG, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 14.5 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 7.5 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 5.5 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 22.66 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 3.16 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ______ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER ~10 FEET.*
13. TOTAL DEPTH OF BOREHOLE 20.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1408.02

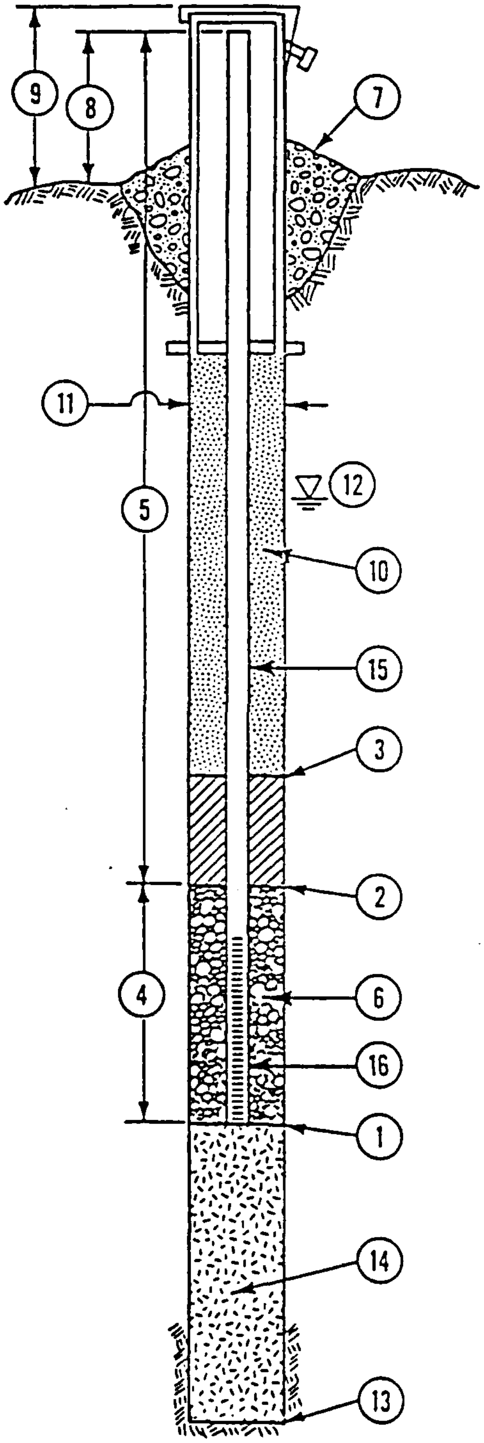
TOP OF WELL CASING ELEVATION 1410.09

JOB NUMBER 1016-267

BORING NUMBER GW10-B

DATE 12/11/86

LOCATION Duluth IAP MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 13.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 3.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 15.07 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 2.07 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ______ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL grout.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER ~8.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 13.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

MONITOR WELL INFORMATION SHEET

GROUND SURFACE ELEVATION 1405.73

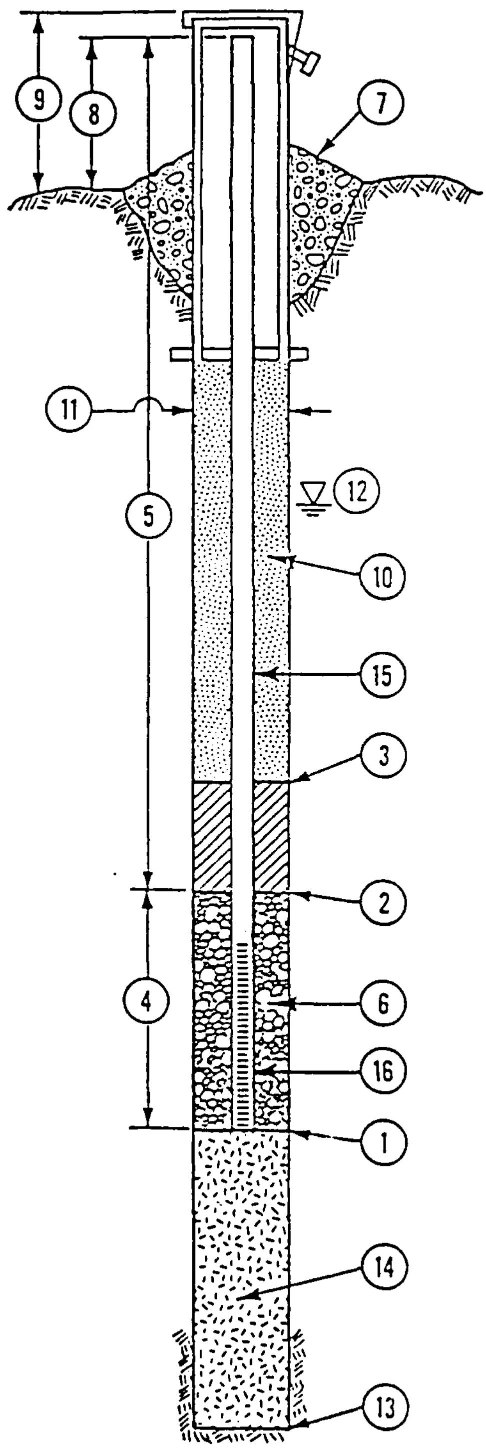
TOP OF WELL CASING ELEVATION 1407.53

JOB NUMBER 1016-267

BORING NUMBER GW 10-C

DATE 12/11/86

LOCATION Duluth IAP, MN



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE 13.0 FEET.*
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) 3.0 FEET.*
3. DEPTH TO TOP OF SEAL (IF INSTALLED) 2.0 FEET.*
4. LENGTH OF WELL SCREEN 10 FEET. SLOT SIZE 0.010.
5. TOTAL LENGTH OF PIPE 14.8 FEET AT 2 INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE Sand.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND 1.8 FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE) HEIGHT ABOVE GROUND ____ FEET. LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL —.
11. BOREHOLE DIAMETER 5 INCHES.
12. DEPTH TO GROUND WATER ~7.0 FEET.*
13. TOTAL DEPTH OF BOREHOLE 13.0 FEET.*
14. TYPE OF LOWER BACKFILL —.
15. PIPE MATERIAL Stainless steel.
16. SCREEN MATERIAL Stainless steel

*(DEPTH FROM GROUND SURFACE)

MONITOR WELL INSTALLATION DETAILS

Dames & Moore

APPENDIX E

FIELD RAW DATA

WELL NO. GW-1A STABILIZATION TEST

DATE: 12/10/86 TIME: 0947

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	160	190	200	215						
pH: ± 0.1 pH unit	6.0	6.5	7.0	7.1						
Temperature: ± 0.5°C	8.0	8.1	8.5	8.7						
Color	brown	same	same	same						
Odor of Discharge	none	none	none	none						

WELL NO. GW-1C STABILIZATION TEST

DATE: 12/11/86 TIME: 1345

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	208	220	218							
pH: ± 0.1 pH unit	6.2	6.2	6.1							
Temperature: ± 0.5°C	7.0	7.0	7.0							
Color	brown cloudy	same	same							
Odor of Discharge	none	none	none							

WELL NO. GW-1D STABILIZATION TEST

DATE: 12/15/86 TIME: 1202

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	131	133	134							
pH: ± 0.1 pH unit	6.4	6.4	6.4							
Temperature: ± 0.5°C	6.9	7.0	7.0							
Color	red brown	same	same							
Odor of Discharge	slight oil odor									

WELL NO. GW-1E STABILIZATION TEST

DATE: 12/15/86 TIME: 0940

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	239	220	213							
pH: ± 0.1 pH unit	6.8	7.2	7.1							
Temperature: ± 0.5°C	7.9	7.8	7.5							
Color	red-brown	same	light brown							
Odor of Discharge			none							

WELL NO. GW-2A STABILIZATION TEST

DATE: 1/1/87 TIME: 1436

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	212	218	222							
pH: ± 0.1 pH unit	5.1	5.8	5.9	5.9						
Temperature: ± 0.5°C	3.5	4.0	4.2							
Color	red brown	same	same							
Odor of Discharge	none	none	none							

WELL NO. GW-2B STABILIZATION TEST

DATE: 1/2/87 TIME: 0854

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	380	375	380	385						
pH: ± 0.1 pH unit	6.1	6.45	6.5	6.5						
Temperature: ± 0.5°C	3.2	2.9	3.0	3.0						
Color	light brown	same	same	same						
Odor of Discharge	none		stale	same						

WELL NO. GW-2C STABILIZATION TEST

DATE: 1/2/87 TIME: 1003

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	91	98	90							
pH: ± 0.1 pH unit	5.4	5.7	5.75							
Temperature: ± 0.5°C	7.0	6.5	6.5							
Color	light brown	same	same							
Odor of Discharge	none	same	same							

WELL NO. GW2-D STABILIZATION TEST

DATE: 1/2/87 TIME: 1456

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	482	505	505	505						
pH: ± 0.1 pH unit	5.85	6.0	6.0	6.0						
Temperature: ± 0.5°C	7.0	7.1	7.1							
Color	light brown	same	same							
Odor of Discharge	sweet	same	same							

WELL NO. GW-2E STABILIZATION TEST

DATE: 1/3/87 TIME: 0931

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	950	950	930	930						
pH: ± 0.1 pH unit	6.0	6.2	6.2	6.2						
Temperature: ± 0.5°C	6.4	7.0	6.8	6.8						
Color	light brown	same	same	same						
Odor of Discharge	sweet	same	same	same						

WELL NO. 6W3A STABILIZATION TEST

DATE: 1/6/87 TIME: 0833

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	120	110	113	111						
pH: ± 0.1 pH unit	6.69	6.3	6.30	6.30						
Temperature: ± 0.5°C	5.8	5.9	5.8	5.3						
Color	red-brown, silty	same	same	same						
Odor of Discharge	none	none	none	none						

WELL NO. GW-3B STABILIZATION TEST

DATE: 1/6/87 TIME: 1234

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	459	471	468	469						
pH: ± 0.1 pH unit	5.8	5.9	6.0	5.9						
Temperature: ± 0.5°C	6.8	6.8	6.4	6.8						
Color	Light brown	same	same	same						
Odor of Discharge	chemical	same	same	same						

WELL NO. GW-3C STABILIZATION TEST

DATE: 1/6/87 TIME: 1000

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	238	210	236							
pH: ± 0.1 pH unit	6.2	6.3	6.3							
Temperature: ± 0.5°C	6.2	5.9	5.9							
Color	light brown	same	same							
Odor of Discharge	none	none	none							

WELL NO. GW-3D STABILIZATION TEST

DATE: 1/7/87 TIME: 1004

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	551	550	550	550						
pH: ± 0.1 pH unit	6.1	6.35	6.45	6.51						
Temperature: ± 0.5°C	6.0	7.0	6.5	6.5						
Color	dark brown	same	same	same						
Odor of Discharge	chemical sweet	same	same	same						

WELL NO. GW-4A STABILIZATION TEST

DATE: 12/18/86 TIME: 1510

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	390	399	401							
pH: ± 0.1 pH unit	6.5	6.4	6.4							
Temperature: ± 0.5°C	5.9	6.1	6.3							
Color	brown cloudy	brown	same							
Odor of Discharge	sulfur odor	same	same							

WELL NO. GW-4B STABILIZATION TEST

DATE: 12/19/86 TIME: 1319

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	205	251	300	330	329					
pH: ± 0.1 pH unit	7.3	6.7	6.5	6.3	6.3					
Temperature: ± 0.5°C	6.0	5.5	5.5	5.1	5.1					
Color	brown, slight red	same	same	same	same					
Odor of Discharge	petro. odor	same	same	same	same					

WELL NO. GW-4C STABILIZATION TEST

DATE: 12/19/86 TIME: 1205

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	630	630	630							
pH: ± 0.1 pH unit	6.8	6.9	6.9							
Temperature: ± 0.5°C	8.0	8.0	8.0							
Color	red brown cloudy	red brown								
Odor of Discharge	slight petro. odor	same								

WELL NO. GW-4D STABILIZATION TEST

DATE: 12/19/86 TIME: 0901

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	471	750	760	800	800					
pH: ± 0.1 pH unit	5.8	6.3	6.5	6.6	6.6					
Temperature: ± 0.5°C	7.0	7.4	7.2	7.3	7.3					
Color										
Odor of Discharge		slight petro. odor								

Note: 1st bailer, yellow-clear color;
2nd bailer, brown silt.

WELL NO. GW-5A STABILIZATION TEST

DATE: 12/17/86 TIME: 0831

PARAMETER	WELL VOLUME EXTRACTED									
	0851	0950	1042							
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	274	290	284							
pH: ± 0.1 pH unit	6.8	6.8	6.7							
Temperature: ± 0.5°C	7.0	8.0	7.5							
Color	dark red-brown	red brown clearing	same							
Odor of Discharge	none	none	none							

Note: Very slow recharge.

WELL NO. GW-5B STABILIZATION TEST

DATE: 12/15/86 TIME: 1524

PARAMETER	WELL VOLUME EXTRACTED									
	12/15 1551	12/16 0845	0908	1 gal. 0914	1 gal. 0921					
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	212	385	461	435	438					
pH: ± 0.1 pH unit	6.4	6.4	6.6	6.7	6.7					
Temperature: ± 0.5°C	7.1	6.9	9.1	6.5	6.9					
Color	red-brown	same	light red brown clearer	clearer						
Odor of Discharge	none	none	none	none	none					

Note: Extremely slow recharge.

WELL NO. GW-5C STABILIZATION TEST

DATE: 12/16/86 TIME: 1158

PARAMETER	WELL VOLUME EXTRACTED									
	1230	1327	1450							
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	630	750	580							
pH: ± 0.1 pH unit	6.4	6.6	6.8							
Temperature: ± 0.5°C	8.2	11.0	8.1							
Color	dark brown	tan	tan clear							
Odor of Discharge	none	none	none							

Note: Slow recharger.

WELL NO. GW-7A STABILIZATION TEST

DATE: 12/16/86 TIME: 1105

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	103	98	105							
pH: ± 0.1 pH unit	5.8	5.65	5.8							
Temperature: ± 0.5°C	6.0	5.9	7.8							
Color	tan	light tan	light tan							
Odor of Discharge	none	none	none							

WELL NO. GW-7B STABILIZATION TEST

DATE: 12/18/86 TIME: 0925

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	208	200	190							
pH: ± 0.1 pH unit	6.6	6.6	6.7							
Temperature: ± 0.5°C	6.1	6.0	6.3							
Color	red-brown	same	same							
Odor of Discharge	none	none	none							

Note: Rapid recharge.

WELL NO. GW-7C STABILIZATION TEST

DATE: 12/17/86 TIME: 1525

PARAMETER	WELL VOLUME EXTRACTED									
	12/17 1603		12/18 0852	12/19 0802						
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	358	385	345	360						
pH: ± 0.1 pH unit	6.9	7.0	6.5	6.4						
Temperature: ± 0.5°C	3.5	5.0	3.0	4.0						
Color	red-brown	same	red brown clearer							
Odor of Discharge	none	none	none	none						

Note: Extremely slow recharge. Recovers at approximate rate of 1 ft./hour.

WELL NO. GW-8A STABILIZATION TEST

DATE: 1/9/87 TIME: 1307

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	460	540	580	550	550					
pH: ± 0.1 pH unit	6.1	6.3	6.4	6.49	6.50					
Temperature: ± 0.5°C	6.8	6.0	6.2	5.9	5.9					
Color	dark gray-brown	same	same	same	same					
Odor of Discharge	slight sweet	same	same	same	same					

WELL NO. GW-8B STABILIZATION TEST

DATE: 1/7/87 TIME: 1202

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	412	395	372	359	356					
pH: ± 0.1 pH unit	6.7	6.6	6.6	6.6	6.5					
Temperature: ± 0.5°C	5.9	6.2	6.8	6.9	7.0					
Color	brown	same	same	same	same					
Odor of Discharge	none	none	none	none	none					

WELL NO. GW-8C STABILIZATION TEST

DATE: 1/9/87 TIME: 1445

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	487	540	550	540						
pH: ± 0.1 pH unit	6.8	6.7	6.7	6.65						
Temperature: ± 0.5°C	6.2	6.9	6.9	7.1						
Color	brown	same	same	same						
Odor of Discharge	slight sewage	same	same	same						

WELL NO. GW-10A STABILIZATION TEST

DATE: 12/31/86 TIME: 1030

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	330	335	335	330						
pH: ± 0.1 pH unit	6.0	6.2	6.2	6.25						
Temperature: ± 0.5°C	6.01	6.8	6.5	6.8						
Color	light brown	same	same	same						
Odor of Discharge	none	none	none	none						

WELL NO. GW-10B STABILIZATION TEST

DATE: 1/1/87 TIME: 1053

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	210	233	242	250	250					
pH: ± 0.1 pH unit	5.8	6.1	6.23	6.2						
Temperature: ± 0.5°C	4.0	4.8	5.0	5.01						
Color	light brown	same	same	same						
Odor of Discharge	none	none	none	none						

WELL NO. GW-10C STABILIZATION TEST

DATE: 1/1/87 TIME: 1220

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	210	271	265	268						
pH: ± 0.1 pH unit	6.01	6.2	6.25							
Temperature: ± 0.5°C	4.8	5.0	5.01							
Color	light brown	same	gray brown	same						
Odor of Discharge	none	none	none	none						

Note: Slow recharge.

WELL NO. MW-1 STABILIZATION TEST

DATE: 1/3/87 TIME: 1423

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	485	600	620	680	680					
pH: ± 0.1 pH unit	6.29	6.5	6.5	6.4	6.4					
Temperature: ± 0.5°C	7.2	7.8	7.6	8.0	8.0					
Color	light brown	same	same	same	same					
Odor of Discharge	slight sweet	same	same	same	same					

WELL NO. MW-2 STABILIZATION TEST

DATE: 1/3/87 TIME: 1315

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	460	600	650	650						
pH: ± 0.1 pH unit	6.1	6.32	6.3	6.3						
Temperature: ± 0.5°C	6.8	7.0	7.0	7.0						
Color	yellow brown	same	same	same						
Odor of Discharge	slight sweet	same	same	same						

WELL NO. MW-4 STABILIZATION TEST

DATE: 1/4/87 TIME: 1253

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	355	365	383	391	398					
pH: ± 0.1 pH unit	5.7	6.0	6.1	6.2						
Temperature: ± 0.5°C	6.5	7.0	7.0	7.0						
Color	red brown	same	same	same						
Odor of Discharge	stale	same	same	same						

WELL NO. MW-5 STABILIZATION TEST

DATE: 1/4/87 TIME: 1029

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	349	335	338							
pH: ± 0.1 pH unit	6.6	7.0	7.3							
Temperature: ± 0.5°C	7.0	6.8	7.5							
Color	red brown	same	dark brown							
Odor of Discharge	stale	same	same							

Note: Bailed dry after ≈ 6 gallons; slow recharge.

WELL NO. MW-6 STABILIZATION TEST

DATE: 1/4/87 TIME: 1523

PARAMETER	WELL VOLUME EXTRACTED									
	1530		1617							
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	380	410	405							
pH: ± 0.1 pH unit	5.8	6.5	6.6							
Temperature: ± 0.5°C	6.0	7.0	7.0							
Color	red brown	same	same							
Odor of Discharge	none	slight sweet								

Note: Slow recharge.

WELL NO. MW-7 STABILIZATION TEST

DATE: 1/5/87 TIME: 1434

PARAMETER	1/5 1440		1/6 1535	WELL VOLUME EXTRACTED						
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	365	402	392							
pH: ± 0.1 pH unit	6.5	6.9	6.5							
Temperature: ± 0.5°C	5.2	7.0	7.1							
Color	light brown	gray brown	same							
Odor of Discharge	none	none	none							

Note: Extremely slow recharge.

WELL NO. MW-8 STABILIZATION TEST

DATE: 12/20/86 TIME: 0830

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	220	238	250	255	253					
pH: ± 0.1 pH unit	5.8	5.9	6.0	6.0	6.1					
Temperature: ± 0.5°C	6.5	7.2	8.0	8.0	8.0					
Color	tan	red brown, silty	same	same	same					
Odor of Discharge	none	none	none	none	none					

WELL NO. MW-9 STABILIZATION TEST

DATE: 12/20/86 TIME: 1126

PARAMETER	WELL VOLUME EXTRACTED									
	1139	1300	1324	1416						
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	471	460	450	455						
pH: ± 0.1 pH unit	5.9	6.2	6.2	6.2						
Temperature: ± 0.5°C	7.0	7.9	7.0	6.9						
Color	yellow-brown	brown	brown	brown						
Odor of Discharge	petro.-diesel odor									

Note: Slow recharge.
Slight foaming during purging.

WELL NO. MW-10 STABILIZATION TEST

DATE: 12/20/86 TIME: 1035

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: µmhos/cm	430	420	429							
pH: ± 0.1 pH unit	6.0	5.9	5.9							
Temperature: ± 0.5°C	7.8	7.5	7.2							
Color	yellow-brown	brown-yellow	brown-yellow							
Odor of Discharge	strong petro. odor	same	same							

WELL NO. MW-11 STABILIZATION TEST

DATE: 12/20/86 TIME: 1214

PARAMETER	WELL VOLUME EXTRACTED									
	1228	1253	1403	1542						
	1	2	3	4	5	6	7	8	9	10
Field Conductivity: μmhos/cm	351	340	329	325						
pH: ± 0.1 pH unit	7.1	7.1	6.8	6.8						
Temperature: ± 0.5°C	10.0	9.7	8.0	7.9						
Color	brown	same	same	same						
Odor of Discharge	none	none	none	none						

APPENDIX F

FIELD AND LABORATORY QUALITY CONTROL PROCEDURES

FIELD AND LABORATORY QUALITY CONTROL PROGRAMS

FIELD INVESTIGATION QUALITY CONTROL PROGRAM

The Technical Operations Plan (TOP) presented in Appendix M describes the methods and procedures that were used to accomplish the tasks defined during the Stage 2 investigation at Duluth IAP. Guidelines of the Occupational Safety and Health Administration (OSHA), United States Environmental Protection Agency (USEPA), and USAF, as well as previous investigations at Duluth IAP, were reviewed to select the methods that would be most appropriate for this investigation. The TOP is designed primarily to give guidance to personnel in the field and to ensure that standard methods of investigation are used.

LABORATORY QUALITY CONTROL PROGRAM

UBTL is an accredited laboratory of the American Industrial Hygiene (AIHA) Association (No. 17) and, as such, participates in an extensive interlaboratory proficiency analytical testing program sponsored by the National Institute for Occupational Safety and Health (NIOSH). In addition, UBTL is currently licensed by the Center for Disease Control (CDC) to perform chemical and clinical analyses of biological specimens and is State of Utah/USEPA approved for environmental analyses. The comprehensive internal quality control program at UBTL is detailed as follows.

Introduction

UBTL has implemented an effective system for Quality Control (QC) for samples analyzed from Duluth IAP. Procedures that are employed include:

1. Services of a full-time Quality Control/Quality Assurance Section;
2. Preparation of internal quality control samples;
3. Collection and evaluation of quality control data;
4. Generation of quality control charts; and
5. Instrument calibration and maintenance.

Sample Analyses

At least one blank sample and one reagent blank are included with each set of analyses and processed through the complete analytical procedure in order to detect any contamination in either collection media or reagents. In addition, duplicate analyses are accomplished on a minimum of 10 percent of all samples submitted from the field. Internal quality control samples, generated in the laboratory and containing known quantities of specified analyte(s), are run at the rate of 10 percent of the total field sample workload. At the completion of the analysis of a sample set, each chemist calculates his results and reports the results on the Analytical Report Form. Results for replicated samples and internal quality control samples are reported on the computer-generated Quality Control Data Sheet. Before the results are submitted to the Group Leader, another peer chemist analyst is assigned to check results for possible errors in the calculations. He must approve results reported on both the quality control sheet and the sample sheet. The Group Leader, after his evaluation of the data, gives the report sheets to the Quality Assurance Specialist (QAS) for his evaluation and implementation of any required action.

Specific steps are followed when any one QC sample result is determined to be out of control in connection with the analysis of a field sample set. QC charts with adjusted control limits of $\pm$ 3 standard deviations will generally be used to determine whether a result is out of control. If QC results are in control, the QAS signs off the report. It is then reviewed by the Section Head for accuracy of the results. Upon final approval of the reports by the QAS and the Section Head, the reports are sent to the sponsor.

The paperwork containing the raw data for a sample set (i.e., chart paper, computer readouts, paper tapes, calibration curves, tables of data, etc.) is collected and placed in an 8½- by 11-inch envelope that has been labeled with sample numbers, analyst, date, and other pertinent information. The envelopes are filed by laboratory number for possible future reference and data retrieval. Raw data for each sample analysis are therefore readily available, if needed.

Quality Control Sample Data Analysis

A record of the preparation of internal QC samples is detailed in the QC log book maintained by the QAS. As appropriate, a set of QC samples is distributed to the chemist along with each sample set at an average rate of at least 10 percent of the submitted samples. The analyses and data evaluations are performed for these QC samples, along with the submitted samples, and results are tabulated on the computer-generated Quality Control Data Sheet. At least duplicate results are reported for each internal QC sample.

QC charts are generated for each analyte through the analysis of QC sample results. Each result is divided by the theoretical value to standardize results so that data from all concentrations can be directly compared for accuracy and precision. When a control data set of N sample results has been accumulated, the following statistics are calculated: mean percent recovery, replicate standard deviation, and set standard deviation. These statistics are then used to determine accuracy and precision QC limits.

The control data set is updated after evaluation of 20 successive QC samples and includes data on the 50 most recent results. Any control sample analysis that is beyond accuracy or precision limits is not used in the subsequent determination of new limits.

External Quality Control Programs

In addition to internally generated QC data, other information concerning QC is provided by the participation of UBTL in four interlaboratory QC programs: NIOSH Proficiency Analytical Testing (PAT) Program; two CDC Blood Lead QC Programs; and State of Utah Environmental Quality Control Program. The PAT Program and the CDC Blood Lead Programs involve the participation of more than 100 laboratories on a nationwide basis. The PAT Program addresses the analysis of filter samples for lead, cadmium, zinc, free silica, and asbestos and the analysis of charcoal tubes for various organic solvents.

Laboratory Data Reduction

A significant fraction of the Chemistry Department's work involves data processing. Mathematical models, based upon analysis of standard solutions or samples, are generated in order to determine the quantity of analyte present in the samples. Considerable time and effort are saved by the utilization of automated data processing procedures. Data processing by the computer can include, for example, calculations, generation of standard calibration curves, mathematical modeling of standard curves, statistical analyses, and the generation of hard copy output. Advantages intrinsic to the use of an automated system include more accurate calculations, immediate and accurate generation of data plots, fewer transcription errors, and no calculation errors after programs have been verified and documented. In general, the types of data that are processed are those derived from the following techniques: atomic absorption and flame emission spectroscopy, gas and liquid chromatography, optical absorbance spectrophotometry, specific ion electrode, fluorescence spectroscopy, and wet chemistry determinations. Similar functions are employed for QC data. In addition, the data system is utilized to store QC data, provide statistical analyses, and generate and update QC charts. The advantage of the provision for statistical analyses and the production of QC charts by automation is that the charts may be easily updated with minimal effort. QC data and any required action may, therefore, be provided on a daily basis.

Reporting Procedures

The analytical data are reported to the sponsor at the completion of each sample set. The report includes the following items:

1. A memorandum describing the sample set; the condition and appearance (i.e., homogeneity, integrity, etc.) of the samples upon receipt at UBTL; the method, equipment, and technique used in the determination; any interferences that were observed; and any unusual circumstances that may have occurred during the analysis. [The limit(s) of detection are also reported.]

2. UBTL Analytical Report Form, including field ID number, laboratory ID number, identification of the analytes, results of each determination, limit(s) of detection, and comments.

3. Other items, such as copies of strip chart recorder output, computer printout sheets, and other raw data (to be included as required).

Instrumentation

Each major equipment item at the UBTL Chemistry Department undergoes a routine preventive maintenance check on a regular schedule. This check is accomplished by a trained engineer. In addition, performance checks are made by the analyst prior to the analysis of each set of samples. This involves the analysis of one or more standards and a comparison of the values obtained with previous results and conditions. This information is recorded in an instrumentation log.

When an instrument or apparatus malfunctions and the problem is not readily corrected, the appropriate Section Head is notified. If it is determined that a visit by the service representative is required, a service call is scheduled and the QAS is notified. Action by the service representative is recorded by the QAS in the Instrument Maintenance Log, and the appropriate customer field and service order forms are filed, by instrument, in the Instrument Maintenance Log Supplement File. In an effort to monitor and maintain instrument specifications, logs for each of the AA spectrophotometers, the gas chromatographs (GC), the X-ray diffractometer (X-ray), and the mass spectrometers (MS) have been provided for the analytical chemists' use each time an analysis is performed. The AA instrumentation logs contain entries for date, analyst, lamp number (if more than one lamp is available), standard concentration (recommended in manual), reading in milliabsorbence units, and a column for when instrumental parameters differ from the recommended conditions listed in the manual. The GC, X-ray, and MS logs contain entries for date, time, analyst, set identification number, and comments on parameters or performance.

Training

UBTL has established a continuing program of training of current personnel with respect to QC procedures. In addition, an intensive program for the training of recently recruited personnel in both analytical methods and techniques and QC policies has been implemented. It is the responsibility of the QAS and the Laboratory Director to train all laboratory personnel.

Results of the Laboratory QC Program

The results of the QC analyses for soil and ground water samples are presented in Appendix H, Analytical Reports.

In general, the laboratory QC program produced analyses of duplicate and spiked samples that were satisfactory. Details of the gas chromatographic columns are presented in the transmittal letter from UBTL in Appendix H.

One exception to the acceptable recovery of spike samples is noted in the QC data: the spike of toluene in soil from Sample B2-C, 0 to 1.5 feet. The recovery was 32 percent, in contrast to the range of 46 to 148 percent allowed by the USEPA Contract Laboratory Program contract.

The analyses of trip blanks indicate that the majority of the blanks were clean. The only exceptions were a concentration of 5.4 µg/L of chloroform in Trip Blank, Site 7, and a concentration of 0.01 µg/L of 4,4'-DDT in SW-8B. The concentration of chloroform in the trip blank is very similar to the detected concentration of 7.0 µg/L in GW-7B; therefore, the reported concentration cannot be considered unequivocal. The presence of 4,4'-DDT in Trip Blank SW-8B presents a similar problem, as this compound is present in Sample SW-8B at the same concentration. This concentration, therefore, cannot be corroborated. For these reasons, these analyses were not taken into account for assessments at Sites 7 and 8.

APPENDIX G

CHAIN-OF-CUSTODY RECORDS

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP Duluth MN

Job No. 1016-267

Field Personnel (Signature) Amy D Bamberg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
~~11/12~~		~~[illegible]~~	~~Soil~~	~~1~~	~~#2~~	
11/12		B2-B 0-1.5' #3	Soil	1	" #2	
"/12		B2-B 2.5-4.0' #5	"	1	"	
11/12		B2-B 5.0'-6.5' #7	"	1	"	
11/13		B2-B 7.5-9.0' #9	"	1	"	Do not analyze per call from
11/13		B2-B 10.0-11.5' #11	"	1	"	Amy Bamberg 11/19/86 [illegible]
11/13		GW-2A 5.0-6.5' #13	"	1	"	
11/14		GW-2B 5.0-6.5 #16	"	1	"	
11/14		GW-2C 15-16.5 #18	"	1	"	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
A Bamberg	11/15/86	1030	Fed Ex.			Fed Ex.	11/19/86	0930	M Simon	11/19/86	0930
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF Ph II Stg 2 IFP

Project Title: Duluth IAP, Duluth, MN

Job No. 1016-267

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/19		B1-A, 0-1.5' #39	Soil	1	1	
"		B1-A, 2.5-4.0' #41	"	"	"	
"		B1-A, 5.0-6.5' #43	"	"	"	
"		GW1-B, 5.0-6.5' #45	"	"	"	
11/18		B6-B, 2.5-4.0' #35	"	"	6	
11/18		GW1-A, 10-11.5' #37	"	"	1	
11/17		B2-C, 5.0-6.5' #23	"	"	2	
11/18		B6-A, 0-1.5' #29	"	"	6	
11/17		B2-C, 2.5-4.0' #21	"	"	2	
11/17		GW2-E, 15.0-16.5' #27	"	"	2	
11/18		B6-A, 2.5-4.0 #31	"	"	6	
11/18		B6-B, 0-1.5', #33	"	"	6	
11/17		B2-C, 0-1.5 #19	"	"	2	
11/17		GW2-D, 15-16.5' #25	"	"	2	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	11/19/86		Fed. Ex.			Fed. Ex.	11/21/86	0905	[signature]	11/21/86	0905
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP MN

Job No. 1016-267

Field Personnel (Signature) [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/20		GW1-D 5.0-6.5	#47 soil	1	1	Filken
11/20		GW1-E 20.0-21.5	#51 "	1	1	
11/21		GW5-A, 5.0-6.5	#59 "	1	5	
11/21		GW5-B 9.5-11.0	#57 "	1	5	
11/22		GW5-C 10.0-11.5	#49 "	1	5	
11/23		GW7-A 10.0-11.5	#54 "	1	7	
11/23		GW7-B, 10.0-11.5	#55 "	1	7	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	11/23/[illegible]	1500	PTC Air Freight			PTC Air Freight	11/[illegible]	1400	M. Simmons	11/[illegible]	
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client KAF Duluth ... MN

Project Title

Job No. 1016-267

Field Personnel (Signature) [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/23/80		95 + 96	601, 602	6	SW-3A	
		110	601	3	SW-3B	
		112	602	3	SW-3B	
		~~[illegible]~~ 134 + 139	601, 602	6	SW-3C	
		141 + 142	metals, Herb	2	SW-3C	
		143, [illegible]	O+G, Pest Phenol	3	SW-3C	
		93 + 94	metals, mercury	2	SW-3A	
		140	mercury	1	SW-3C	
		137	soil	1	SS-3C	
		92	soil	1	SS-3A	
		111	soil	1	SS-3B	
		113 + 114	mercury metals	2	SW-3B	
		117	Pest	1	SW-3B	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible signature]	11/23/80	17:30	PTC Air Freight			PTC Air Freight	11/24/80	1400	M. Simmons	11/24/80	1400
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: SAF Duluth [illegible]

Project Title:

Job No. [illegible]

Field Personnel (Signature): [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/22		-99	O&G	1	SW-3A	
		[illegible]	Hexc	1	[illegible]	
		[illegible]	[illegible]	1	[illegible]	
		[illegible]	Herc	1	[illegible]	
		[illegible]	Herb	1	[illegible]	
		[illegible]	O&G		[illegible]	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	[illegible]	[illegible]				Private Carrier	11/25/88	1115	M. Simmons	11/25/88	1115
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF DULUTH IAP - DULUTH, MN

Field Personnel (Signature) John A. Meadow

Project Title

Job No. 1016-274

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/22/86		148	Oil Grease	1	SW5A	
		150	HERB.	1	SW5A	
		146	PEST.	1	SW5A	
		152	PHENOL.	1	SW5A	
		157	MERCURY	1	SW5A	
		154	METALS	1	SW5A	
		163	SEDIMENT	1	SW5A	
		158 + 159	602/601	3/3	SW5A	
		188	PHENOLS	1	SW5C	
		189	PEST.	1	SW5C	
		187	Oil + Grease	1	SW5C	
		185	Mercury	1	SW5C	
		186	Metals	1	SW5C	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	11/24/86	1200 NOON				Private Carrier	11/25/86	1115	M. Simmons	11/25/86	1115
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF IAP DULUTH - DULUTH, MN.

Project Title

Job No. 1016-267

Field Personnel (Signature) John A. Meadow

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/22/86		164	PESTICIDE	1	SW5B	
		167	Phenol	1	SW5B	
		169	O+G	1	SW5B	
		170	HERB.	1	SW5B	
		173	Metals	1	SW5B	
		175	Mercury	1	SW5B	
		176 + 178	601/602	3/3	SW5B	
		180	Sediment	1	SW5B	
11/23/86		206	O+G	1	SW4A	
		207 + 209	602/601	3/3	SW4A	
		211	Sediment	1	SW4A	
		214	O+G	1	SW4B	
		216 + 217	601/602	3/3	SW4B	
		220	Sediment	1	SW4B	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	11/24/86	1200 noon				Private Carrier	11/25/86	1115	M Simmons	11/25/86	1115
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Duluth IAP MN

Field Personnel (Signature) Brian J. Conti

Project Title

Job No. 1016-267

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/22		183, 184	601, 602	6	SW-5C	
11/23		237 & 238	601, 602	6	SW-1A	
		256 & 257	601, 602	6	SW-1B	
		221 & 222	601, 602	6	SW-4C	
		233 & 234	601, 602	6	SW-4D	
		260 & 261	metals, mercury	2	SW-1B	
		242 & 243	metals, mercury	2	SW-1A	
		258 & 259	Herb, O&G	2	SW-1B	
		262 & 263	Pest, Phenol	2	SW-1B	
		245	soil	1	SS-1A	
		255	soil	1	SS-1B	
		273	602	3	SW-1B	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Brian J. Conti	11/24/86	1200					11/25/86				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF DULUTH IAP, MN.

Project Title

Job No. 1016-267

Field Personnel (Signature) John A. Meadow

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11-22-86		~~SW2A~~ 69 + 70	601/602	3/3	SW2A	
		66	Oil & GAS	1	SW2A	
		64	phenol	1	SW2A	
		62	SEDIMENT	1	SS2A	
		81 + 79	601/602	3/3	SW2B	
		72	phenol	1	SW2B	
		74	Oil & GAS	1	SW2B	
		76	Sediment	1	SS2B	
		85	Oil & GAS	1	SW2C	
		83	phenol	1	SW2C	
		90 + 91	601/602	3/3	SW2C	
		87	Sediment	1	SS2C	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	11/23/86	~1900 hrs	PTC AirFreight			PTC AirFreight	11/24/86	1400	M. Simmons	11/24/86	1400
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client [illegible]

Project Title

Job No. 1016-267

Field Personnel (Signature) [illegible signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
		[illegible]	Soil	2	[illegible] E	
		191	Soil	1	SS-[illegible]C	
		97+98	[illegible]	2	SW-3A	
11/23		224	Soil	1	SS-4C	
		236	Soil	1	SS-[illegible]D	
		223	Soil	1	SW-4C	
		[illegible]	Soil	1	SW-[illegible]D	
		239+240	[illegible]	2	SW-1A	
		241	[illegible]	1	SW-1A	
		244	Dust	1	SW-1A	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible signature]	11/24/[illegible]	[illegible]				Private Carrier	11/25/[illegible]	1115	M. Simmons	11/25/[illegible]	1115
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Amy D Lamberg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/24		B7-A, 0-1.5 #282	soil	1	7	
11/24		B7-A, 2.5-4.0 #280	"	"	"	
11/24		B7-B, 0-1.5 #274	"	"	"	
11/24		B7-B, 2.5-4.0 #276	"	"	"	
11/24		GW7-C, 15.0-16.5 #278	"	"	"	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Amy D Lamberg	11/25/86					Private Carrier	12/1/86	1215	M Simmons	12/1/86	1215
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: WSA Duluth IAP [illegible]

Project Title:

Job No.:

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
124		304	soils	1	SW-7A	
		298	metals	1		
		296	Mercury	1		
		~~294~~ 294	mercury	1		SPLIT
		293	phenol	1		
		291	Herb	1		
		287	O+G	1		
		284	Pest	1		
		288	O+G	1		SPLIT
		286	Pest	1		SPLIT

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	[illegible]	[illegible]				Private Carrier	12/1/86	1015	[signature]	12/1/86	1015
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF DULUTH IAP, DULUTH MN.

Project Title

Job No. 1016-267

Field Personnel (Signature) John A. Meadow

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/24		299 + 301	602/601	3/3	SW7A	
		336 + 337	601/602	3/3	SW8A	
		317 + 319	601/602	3/3	SW8B	
11/25		305	Pest.	1	SW8B	
		312	O+G	1	SW8B	
11/25		307	Pest.	1	SW8B	SPLIT
		309	Phenol	1	SW8B	
11/25		311	HERB	1	SW8B	
		314	Metals	1	SW8B	
		315	Metals	1	SW8B	SPLIT
11/25		322	Sediment	1	SW8B	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	11/25/86	1130				Private Carrier	12/11/86	1215	M. Simmons	12/11/86	1215
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF DULUTH IAP, DULUTH MN.

Project Title

Job No. 1016-267

Field Personnel (Signature) John Meadow

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/25/86		327	O+G	1	SW8A	SPLIT
		324	Pest.	1	SW8A	
		330	O+G	1	SW8A	
		323	Pest.	1	SW8A	SPLIT
		332	Herb.	1	SW8A	
		325	O+G	1	SW8A	SPLIT-SPK
		329	Phenol	1	SW8A	
		334	Metals	1	SW8A	
		341	Sediment	1	SW8A	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	11/25/86	1130				Private Carney	12/1/86	1215	M. Sinnott	12/1/86	1215
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF Ph II Stg 2 IRP

Project Title: Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature): [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
11/26		SW8-B, #415	H_2O	1	8	Mercury
11/26		SW8-A #416	"	"	8	"
11/26		GW3-A 5.0-6.5, #411	Soil	1	3	VOA, O&G, P/H, PCB's, Phenols, Metal
11/25		B3-A, 0-1.5 #349	"	1	3	
11/25		B3-A 2.5-4.0 #400	"	1	3	
11/25		B3-A, 5.0-6.5, #343	"	1	3	% Moisture
11/25		B3-B, 0-1.5 #401	"	1	3	
11/25		B3-B, 2.5-4.0, #347	"	1	3	
11/25		B3-B, 5.0-6.5 #348	"	1	3	
11/25		B3-C, 0-1.5 #406	"	1	3	
11/25		B3-C, 2.5-4.0, #408	"	1	3	
11/25		B3-C, 5.0-6.5, #410	"	1	3	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	11/26/86	1400				Private Carrier	12/1/86	1215	[illegible]	12/1/86	1215
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Amy D Sambrey

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/1		B3-C, 5.0-6.5, #417	Soil	1	3	
12/1		GW3-B, 5.0-6.5 #419			3	
12/1		Site 3, drum #422			3	EP Tox, Ignitability
12/1		Site 2, drum #421			2	EP Tox, Ignitability
12/2		GW3-D, 5.0-6.5 #426			3	
12/2		GW4A, 10.0-11.5 #427			4	Vol org (EPA 601, SW 8010),
12/2		B4-A, 2.5-4.0 #429			4	Aromatics (E602, SW8020),
12/2		B4-A, 5.0-6.5 # 432			4	Oil & Grease
12/2		B4-A, 7.5-9.0, #433			4	
12/2		B4-B, 2.5-4.0 #436			4	
12/2		B4-B, 7.5-11.5, #438			4	
12/2		B4-B, 5.0-6.5 #439			4	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Amy Sambrey	12/2/86	1730				Private Carrier	12/4	1100	M [illegible]	[illegible]	1100
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, Duluth, MN

Job No. 1011-262

Field Personnel (Signature) [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/3		GW4-C 10.0-12.5	#444	1	4	
12/3		GW4-B 5.0-6.5	#442		4	
12/3		GW4-D 5.0-6.5	#446		4	
12/2	—	GW3-D 5.0-6.5	#425		3 QC	These are splits of
12/2	—	B4-A 5.0-6.5	#431		4 QC	samples you have
12/2	—	B4-A 2.5-4.0	#430		4 split	already received.
12/2	—	B4-[illegible] 2.5-4.0	#434		4 dup	Please use [illegible]
12/2	—	GW4-A [illegible]	#428		4 QC	the QC [illegible]
12/2	—	B4-B 5.0-6.5	#440		4 dup	[illegible]
12/2	—	B4-B 2.5-4.0	#435		4 QC	[illegible]
12/1	—	B3-C 5.0-6.5	#418		3 QC	[illegible]
12/1	—	Site 3 drum	#424		3 split	
12/1	—	Site 3 drum	#423	V	3 dup	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	12/2	1500				Private Carrier	12/4/84	0905	M. Simmons	12/4/84	0905
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Amy D Lamborg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/4		B4-D, 7.5-9.0 #451	Soil	1	4	
12/4		B4-C, 5.0-6.5 #453			4	
12/4		B4-C, 7.5-9.0 #455			4	
12/4		B4-C, 2.5-4.0 #457			4	
12/4		B4-D, 2.5-4.0 #447			4	
12/4		B4-D, 5.0-6.5 #444			4	
12/4		B4-D, 7.5-9.0 #452			4	duplicate
12/4		B4-C, 5.0-6.5 #454			4	spike
12/4		B4-D, 5.0-6.5 #450			4	spike
1-13	09 [illegible]	GW4-C, 10.0-12.0 #443			4	QC

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
A Lamborg	12/4/86					Stat Express	12/8/86	1115	M Simmons	12/8/86	1115

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF [illegible]						Field Personnel (Signature)
Project Title [illegible], MN					Job No. [illegible]	[illegible]
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
[illegible]		[illegible] #454	[illegible]	1	8	[illegible]
		[illegible] #462			4	[illegible]
		B[illegible] 2.5-4.0, #466			[illegible]	
		B[illegible] 0-1.5, #464			[illegible]	
		[illegible] 5.0-6.5 #465			8	
		B[illegible] 2.5-4.0 #469			4	
		B1-E 5.0-6.5 #472			4	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	[illegible]	[illegible]				Stat Express	12/8/86	1430	M Simmons	12/8/86	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF Ph II Stg 2 IRP

Project Title: Duluth IAP, MN

Job No. 1016-287

Field Personnel (Signature): Amy D Samberg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers.	Sampling Site	Remarks
12/6	x	B8-B 2.5-4.0, #475	soil	1	8	
12/6	x	B8-B, 0-1.5, #473	soil	1	8	
12/6	x	GW8-B, 10.0-11.5, #482	soil	1	8	
12/6	x	GW8-A, 5.0-6.5, #480	soil	1	8	
12/6	x	B8-B, 0-1.5, #474	soil	1	8	spike
12/6	x	B8-B, 5.0-6.5, #478	soil	1	8	
12/5	x	Site 4, 0-2.5 #461	soil	1	4	QC
12/5	x	AA-E, 2.5-4.0, #470	soil	1	4	QC
12/6	x	GW8-A, 5.0-6.5, #479	soil	1	8	QC
12/5	x	B8-A, 5.0-6.5, #467	soil	1	8	spike
12/5	x	B8-E, 5.0-6.5, #471	soil	1	8	spike
12/5	x	B8-A, 2.5-4.0, #465	soil	1	8	QC
12/5	x	Site 8, 0-2.5, #460	soil	1	8	duplicate
12/6	x	GW8-B, 10.0-11.5, #481	soil	1	8	duplicate
12/5	x	B8-A, 0-1.5, #463	soil	1	8	duplicate

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Samberg	12/6	1700				Stat Expresss	12/8/92	1430	M Simmons	12/8/92	1430

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client ~~Rat~~ USAF Ph II St 2 IRP

Project Title Duluth IAP, Duluth, MN

Job No. 1016-267

Field Personnel (Signature) Amy Lamberg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/7		GW2-C 10ft 11.5 # 483	Soil	1	8	
12/7		GW2-C' drum, # 485	Soil	1	8	EP TOX, IGNITABILITY

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Lamberg	12/11/86	1400	Private carrier			Private carrier	12/10/86	1645	A. Scott Taylor	12/11/86	1645
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN OF CUSTODY RECORD

Sample Source & Client USAF PHS 2, STG 2, IRP DULUTH IAP, MN

Field Personnel (Signature) John A. Meadow

Project Title

Job No. 1016-267

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/10/86	1-3pm	487	WATER	1	GWIA	HERBICIDE
		~~488~~ 489	WATER	1	GWIA	PHENOLS
		~~489~~ 491	WATER	1	GWIA	OIL & GREASE
		~~490~~ 493	WATER	1	GWIA	PESTICIDES
		~~491~~ 495	WATER	1	GWIA	METALS
		~~492~~ 497	WATER	1	GWIA	MERCURY
		499	WATER	3	GWIA	601
12/10/86	1-3PM	501	WATER	3	GWIA	602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John A. Meadow	12/10/86	1630				Private Carrier	12/15/86	1430	[illegible]	12/15/86	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH2 STG2 IRP DULUTH IAP, MN.

Project Title

Job No.

Field Personnel (Signature) John A. Meador

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/11/86	1-3pm	503	WATER	1	GWIC	PHENOLS
		505	WATER	1	GWIC	HERB.
		507	WATER	1	GWIC	PEST.
		509	WATER	1	GWIC	O+G
		511	WATER	1	GWIC	METALS
		513	WATER	1	GWIC	MERCURY
		515	WATER	3	GWIC	602
		517	WATER	3	GWIC	601
		519	WATER	1	GWIC	HERB (LAB QC)
		520	WATER	1	GWIC	HERB (LAB QC)
		521	WATER	1	GWIC	HERB (LAB QC)
		522	WATER	1	GWIC	HERB (LAB QC)
		523	WATER	1	GWIC	HERB (TRIP BLANK)
12/11/86	1-3pm	524	WATER	1	GWIC	HERB (FIELD QC - BAILER RINSE)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
John Meador	12/12/86	0945				Private Carrier	12/15/86	1430	M. Simmons	12/15/86	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN OF CUSTODY RECORD

Sample Source & Client: USAF PhII Stz2 IRP

Project Title: Duluth IAP MN

Job No. 1016-267

Field Personnel (Signature): Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/15/86	13:24	GW1D, #525	Water	1	~~GW1-D~~ Site 1	Metals
	13:12	GW1-D, #526		1	Site 1	Phenol
	13:09	GW1-D, #527		1	Site 1	Mercury
	13:32	GW1-D, #528		1	Site 1	Oil & Grease
	13:00	GW1-D, #529		1	Site 1	Field QC Mercury Duplicate
	13:47	GW1-D, #530		1	Site 1	Oil & Grease Lab QC
	13:18	GW1-D, #531		1	Site 1	Herbicide
	13:38	GW1-D, #532		1	Site 1	Pesticide
	13:36	GW1-D, #533		1	Site 1	Phenol Lab QC
	13:30	GW1-D, #534		1	Site 1	Phenol Lab QC
	13:50	GW1-D, #535		3	Site 1	602 3 Bottles
	13:32	GW1-D, #536		3	Site 1	601 Lab QC 3 Bottles
	13:55	GW1-D, #537		3	Site 1	601 3 Bottles

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Steven J. Hynek	12/15/86	17:45	[illegible]			Private Carrier	12/19/86	1045	M. Simmons	12/19/86	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Phase 2 Stage 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/15/86	11:11	GWIE #546	Water	1	Site 1	Mercury
	11:25	GWI-E #547		1	Site 1	Herbicide
	11:10	GWI-E #548		1	Site 1	Metal
	11:19	GWI-E #549		1	Site 1	Phenol
	11:12	GWI-E #550		1	Site 1	Mercury Field QC Duplicate
	11:22	GWI-E #551		1	Site 1	Pesticide
	11:19	GWI-E #552		1	Site 1	Metals Field QC Duplicate
	11:26	GWI-E #553		1	Site 1	Oil & Grease
	11:28	GWI-E #554		1	Site 1	Phenol Duplicate
	11:13	GWI-E #555		1	Site 1	Oil & Grease Lab QC
	10:44	GWI-E #556		3	Site 1	601 Lab QC 3 Bottles
	11:07	GWI-E #557		3	Site 1	601 3 Bottles
	11:02	GWI-E #558		3	Site 1	602 3 Bottles

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	12/17/86	17.45	[signature]			Private Carrier	12/19/86	1045	M. Simmons	12/19/86	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Plt # Str- FCP

Project Title Duluth IAP, MN

Job No.

Field Personnel (Signature) A D Lamboy

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/16	1017	6WSB #576	H_2O	1	5	Phenols, duplicate
12/16	1007	6WSB #572		1		Pest
12/16	1010	6WSB #573		1		Phenol
12/16	1005	6WSB #575		1		O&G
12/16	1012	6WSB #574		1		herbicides
12/16	1003	6WSB #570		1		metals
12/16	0959	6WSB #571		1		Mercury
12/16	0918	6WSB #567		3		601
12/16	0949	6WSB #568		3		602, spike
12/16	0918	6WSB #569		3		602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Lamboy	12/16	1717	[illegible]			Private Carrier	12/19/84	1045	M. Simmons	12/19/84	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, MN

Job No.

Field Personnel (Signature) [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/16	1531	GW-5-C #585	H_2O	1	5	O&G
	1518	GW-5-C #586		1		Pest, dupe. field QC
	1533	GW-5-C, #587		1		Phenol
	1520	GW5C, #588		1		Pest
	1522	GW-5C, #589		1		herbicide
	1516	GW-5C #590		1		metals
	1502	GW-5C #591		1		Mercury
	1515	GW5C, #592		1		Mercury field QC blank, [illegible]
	1457	GW-5C, #593		3		602 (3 bottles)
	1459	GW-5C #594		3		601 (3 bottles)
	1457	GW-5C #595		3		602 (3 bottles) field QC, duplicate

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	12/16/88	1700	[illegible]			[illegible]	12/19/88	1045	M Simmons	12/19/88	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II Srs. 2 IRP

Project Title Duluth IAP, MN

Job No.

Field Personnel (Signature) [signature] Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/17/86	13:19	GW7-A #611	Water	1	Site 7	Phenol
	13:13	GW7-A #609		1		Oil & Grease, Duplicate
	13:16	GW7-A #610		1		Oil & Grease
	13:10	GW7-A #608		1		Herbicides
	13:20	GW7-A #607		1		Pesticides
	—	GW7-A #606		1	Site 7	Phenol, Trip Blank
	11:17	GW5-A #635		1	Site 5	Oil & Grease
	13:14	GW7-A #604		1	Site 7	Metals
	13:12	GW7-A #605		1		Mercury
	13:03	GW7-A #614		3		601
	13:11	GW7-A #613		3		602
12/17/86	12:55	GW7-A #612	Water	3	Site 7	602, Spike

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	12/17/86	17:30	[signature]			[signature]	12/19/86	1045	[signature]	12/19/86	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF PH II Stg. 2 IRP

Project Title: Duluth IAP, MN

Job No.

Field Personnel (Signature): Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/17/86	10:51	GWS-A #640	Water	1	Site 5	Phenol Lab QC
	11:06	GWS-A #636		1		Phenol Lab QC
	11:13	GWS-A #634		1		Herbicides
	10:54	GWS-A #639		1		Pesticides Duplicate Field QC
	11:09	GWS-A #641		1		Pesticides
	11:05	GWS-A #642		1		Pesticides Duplicate Field QC
	11:39	GWS-A #637		1		Phenols
	10:52	GWS-A #633		1		Mercury
	10:59	GWS-A #638		1		Metals
	10:36	GWS-A #631		3		602 (3 Bottles)
12/17/86	10:36	GWS-A #632	Water	3	Site 5	601 (3 Bottles
12/17/86	10:36	GWS-A #643	Water	3	Site 5	Field QC Rinse Blank 602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	12/17/86	1730	[illegible]			Private Carrier	12/19/86	1045	M. Simmons	12/19/86	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Field Personnel (Signature): Carol J. Scholl / Carol J. Scholl

Sample Source & Client: USAF 7th St?z TLP

Project Title: Duluth IAP, Duluth, MN

Job No. 1016-267

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/18	1010	GW7B #652	H_2O	3	7	602, field QC, dupe
12/18	1010	GW7B #653	"	"	"	602, spike
12/18	1603	GW4A #771	"	3	4	602
12/18	1601	GW4A #770	"	3	4	601
		GW4A #774	"	3		trip blank
12/18	1010	GW7B #655	"	3	7	601
12/18	1010	GW7B #654	"	3	7	602
12/18	1005	GW7B #669	"	1		Pesticides Trip Blank
12/18	1005	GW7B #668	"	1		Mercury Trip Blank
12/18	1043	GW7B #664	"	1	7	Pesticides
12/18	1029	GW7B #663	"	1	7	Metals
12/18	1049	GW7B #660	"	1	7	Herbicides Lab QC
12/18	1026	GW7B #662	"	1	7	Mercury
12/18	1051	GW7B #658	"	1	7	Pesticides Lab QC
12/18	1049	GW7B #661	"	1	7	Metals field QC dupe

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Carol J. Scholl	12/18/86	1755	[illegible]			Private Carrier	12/19/86	1430	Lee [illegible]	12/19/86	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title

Job No.

Field Personnel (Signature) Carol J. Scholl
CAROL J. Scholl

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/18	1053	GW7B#656	H_2O	1	7	Phenol Lab QC
12/18	1047	GW7B#659	"	1	7	Oil & Grease Lab QC
12/18	1607	GW4A#773	"	1	4	Oil & Grease
12/18	1033	GW7B #667	"	1	7	Herbicides
12/18	1605	GW4A #772	"	1	4	Oil & Grease dupe
12/18	1035	GW7B #666	"	1	7	Oil & Grease
12/18	1045	GW7B#657	"	1	7	Oil & Grease Lab QC
12/18	1043	GW7B#665	"	1	7	Phenol

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Carol J. Scholl	12/18/86	1755	[signature]			Private Carrier	12/19/86	1430	[signature]	12/19/86	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PL II Sng 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature)

Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/19/86	1521	GW7C, #796	Water	1	7	Mercury
	15:25	GW7-C, #798		1	↓	Oil & Grease
	15:23	GW7-C, #799		1		Metals
	15:20	GW7-C #797		1	7	Pesticides
	13:55	GW4-B #786		1	4	Oil & Grease
	14:05	GW4-B #789		1	↓	Oil & Grease Field QC Duplicate
	14:00	GW4-B #787		1		Oil & Grease Lab QC
12/19/86	12:10	GW4-B, #788	Water	1	4	Oil & Grease Lab QC

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	12/19/86	17:15		12/19	1724	Private Carrier	12/24/86	1450		12/24/86	1450
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg 2 IRP

Field Personnel (Signature) Steven J. Hynek

Project Title Duluth IAP, MN

Job No. 1016-267

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/14/86	0951	GW4-D #780	Water	1	4	Oil & Grease
	0945	GW4-D #779		3	4	601 (3 Bottles)
	0940	GW4-D #778		3	4	602 (3 Bottles)
	1305	GW4-C #794		1	4	Oil & Grease Lab QC
	1300	GW4-C #793		1	4	Oil & Grease Lab QC
	1310	GW4-C #795		1	4	Oil & Grease
	12:50	GW4-C #790		3	4	601 (3 Bottles)
	12:55	GW4-C #791		3	4	602 (3 Bottles)
	12:45	GW4-C #792		3	4	Field QC Duplicate (3 Bottles)
	13:50	GW4-B #784		3	4	602 (3 Bottles)
	13:45	GW4-B #785		3	4	601 (3 Bottles)
	15:15	GW7-C #800		3	~~4~~ 7	602 (3 Bottles)
	15:15	GW7-C #801		3	~~4~~ 7	601 (3 Bottles)
	17:00	GW7C #802		1	~~4~~ 7	Metals Bailer Rinse

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	12/19/86	17:15	[signature]	12/19	1724	Private Carrier	12/20/86	1450	[signature]	12/20/86	1450
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, Duluth, MN

Job No. 1016-267

Field Personnel (Signature) [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/20	0800	GW7C, #804	H_2O	1	7	Pesticide Lab QC
12/20	0957	MW8, #808	"	1	4	O&G
12/20	0800	GW7C, #805	"	1	7	herbicide
12/20	1108	MW-10, #807	"	1	4	O&G
12/20	0800	GW7C, #803	"	1	7	Phenol
12/19	1545	GW7C, #806	"	1	7	Phenol Lab QC
12/20	0945	MW8, #814	"	3	4	602 Lab QC dupe.
12/20	0952	MW8, #812	"	3	4	601
12/20	1100	MW10, #810	"	3	4	601
12/20	1104	MW10, #811	"	3	4	602
12/20	0950	MW8, #813	"	3	4	602
12/20	1106	MW10, #809	"	3	4	602 Lab QC dupe.

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	12/20/86		[signature]	12/20	1745		12/23 ?				
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg 2 IEP

Project Title Duluth IAP, Mn

Job No. 1016-267

Field Personnel (Signature)

Steven S. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
12/20/86	15:50	MW11 #820	Water	3	4	601 (3 Bottles)
	14:00	MW11 #821		3		602 (3 Bottles)
	14:00	MW11 #823		1		Oil & Grease Trip Blank
	14:01	MW11 #822		1		Oil & Grease
	14:30	MW19 #825		3		601 (3 Bottles) Field QC
	14:30	MW19 #826		3		602 (3 Bottles)
	14:30	MW19 #827		3		601 (3 Bottles)
	14:30	MW19 #824		3		601 (3 Bottles) Trip Blank
12/20/86	14:50	MW19 #828	Water	1	4	Oil & Grease

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	12/24/86	17:05	[signature]	12/20	1747						
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/1/87	1220	GW10B, #833	H_2O	1	10	Radiologicals, Field QC, dupe
12/31/86	1120	GW10A, #829	H_2O	1	10	Radiologicals
1/1/87	1300	GW10C, #831	H_2O	1	10	Radiologicals
1/1/87	1210	GW10B, #935	H_2O	1	10	Radiologicals, Field QC, dupe

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/1/87	1712	Sm			Private Carrier	1/5/87	1430	[signature]	1/5/87	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF PhII Stg2 IRP

Project Title: Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/1/87	1145	GW10B #834	H_2O	1	10	Radiologicals
1/1/87	1536	GW2A, #838	"	"	2	O&G, lab QC
1/1/87	1531	GW2A, #839	"	"	2	O&G
1/1/87	1530	GW2A, #837	"	"	2	Phenol
1/1/87	1507	GW2A, #840	"	3	2	602
1/1/87	1514	GW2A #841	"	3	2	601
1/1/87	1525	GW2A, #842	"	3	2	602, Field QC dupe

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
A. Jamtay	1/1/87	1700	[signature]			Private Carrier	1/5/87	1430	[signature]	1/5/87	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF PhII Stg2 IRP

Project Title: Duluth IAP, MN

Job No. 016-267

Field Personnel (Signature): [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/2	1545	GW2D, #871	H_2O	1	2	O&G
1/2	1548	GW2D, #870	"	1	2	O&G Lab QC
1/2	0941	GW2B, #847	"	1	2	O&G
1/2	1108	GW2C, #857	"	1	2	Phenol
1/2	0929	GW2B, #852	"	3	2	601
1/2	1054	[illegible], #[illegible]	"	3	2	601
1/2	1102	GW2C, #856	"	3	2	602 field QC [illegible]
1/2	1048	GW2C, #855	"	3	2	602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	1/2/86	1715	[illegible]			Private Carrier	1/5/87	1430	[illegible]	1/5/87	1430

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF Ph II Stg 2 IRP

Project Title: Duluth IAP, MN

Job No. 1016-202

Field Personnel (Signature): [illegible]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/3	1400	MW2 #910	H_2O	1	2	GdG
1/3	1402	MW2 #909	"	1	2	Phenol
1/3	1628	GW2E #902	"	1	2	Phenol
1/3	1500	MW1 #903	"	1	2	GdG
1/3	1340	MW2 #914	"	3	2	GC/2, lab QC dupe
[illegible]	[illegible]	#913	"	3		Trip blank (w/bubble)
1/3	1351	MW2 #911	"	3	2	GC-1
1/3	1353	MW2 #912	"	3	2	GC2

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	1/3/87	1633	[illegible]			Private Carrier	1/5/87	1430	[illegible]	1/5/87	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title [illegible] IAP MN

Job No. 1016-267

Field Personnel (Signature) [illegible signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/3	1510	MW1 #[illegible]	H_2O	1	2	Phenol
1/3	1022	GW2E #[illegible]	"	1	2	[illegible]
1/3	1512	MW1 #965	"	3	2	602 [illegible]
1/3	1510	MW1 #964	"	3	2	[illegible]
1/3	1505	MW1 #[illegible]	"	3	2	601
1/3	1021	GW2E #[illegible]	"	3	2	601 [illegible]
1/3	1003	GW2E #[illegible]	"	3	2	601
1/3	[illegible]	GW2E #[illegible]	"	3	2	602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible signature]	1/3/87	1642	[illegible signature]			Private Carrier	1/5/87	1430	[illegible signature]	1/5/87	1430
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF Ph II Stg 2 IAP

Project Title: Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature): A Jamborg

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/2	1006	GW2-C #858	H_2O	1	2	O&G
1/2	1555	GW2-D #873	"	1	2	O&G, Lab QC
~~1/2~~	~~1108~~	~~GW2C #85?~~	~~"~~	~~1~~	~~2~~	~~Phenol~~
1/2	0945	GW2B, #848	"	1	2	O&G, Lab QC
~~1/2~~	~~0941~~	~~GW2B, #847~~	~~"~~	~~1~~	~~2~~	~~O&G~~
1/2	1552	GW2D, #872	"	1	2	Phenol
1/2	0947	GW2B, #850	"	1	2	O&G, Field QC dup
1/2	0949	GW2B, #851	"	1	2	Phenol
~~1/2~~	~~1545~~	~~GW2D, #871~~	~~"~~	~~1~~	~~2~~	~~O&G~~
~~1/2~~	~~1548~~	~~GW2D, #870~~	~~"~~	~~1~~	~~2~~	~~O&G Lab QC~~
1/2	1544	GW2D, #869	"	3	2	601, Lab QC
1/2	1541	GW2D, #867	"	3	2	601
1/2	1530	GW2D, #868	"	3	2	602
1/2		GW2B, #853	"	3	2	602

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
A Jamborg	1/2/87	1703	[signature]			Private Carrier	1/5/87	1430	Lee Harris	1/5/87	1430

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Amy Lambos

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/4	1355	MW4 #915	H_2O	1	2	Phenol
1/4	1239	MW5, #925	"	1	2	O&G
1/4	1633	MW6, #934	"	1	2	O&G
1/4	1353	MW4, #916	"	1	2	O&G
1/4	1242	MW5, #924	"	1	2	Phenol
1/4	1438	MW6 #933	"	1	2	Phenol
1/4	1157	MW5, #927	"	3	2	601
1/4	1348	MW4, #919	"	3	2	602 Field QC dup
1/4	1343	MW4, #918	"	3	2	601
1/4	1336	MW4 #917	"	3	2	602
1/4	1210	MW5, #928	"	3	2	602 Field QC, dup
1/4	1204	MW5, #926	"	3	2	602
1/4	1626	MW6, #935	"	3	2	601
1/4	1619	MW6, #936	"	3	2	602
-						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Lambos	1/4/87	1747	M. Simpson	1/4/87	1831				R. Scott Taylor	1/6/87	10:30
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) [signature] Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/6/87	0928	GW3A #966	Water	1	#3	Oil & Grease Field QC Dupl.
	0915	GW3A #965		1		Oil & Grease
	1028	GW3C #985		1		Oil & Grease
	1330	GW3B #991		1		Pesticides Lab QC
	0927	GW3A #967		1		Pesticides Lab QC
	1344	GW3B #997		1		Pesticides
	0922	GW3A #971		1		Herbicides
1/6/87	1340	GW3B #998	Water	1	#3	Herbicides

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/6/87	17:15	[signature]			Private Carrier	1/7/87	1500	[signature]	1/7/87	1500
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PhII Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) [signature] Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/6/87	1330	GW3B #994	WATER	1	#3	PHENOL
	1331	GW3B #1000		1		METALS
	1333	GW3B #992		1		PHENOL LAB QC
	1330	GW3B #999		1		MERCURY
	1131	GW3C #981		1		PESTICIDE LAB QC
	1003	GW3C #987		1		MERCURY
	0924	GW3A #968		1		PHENOLS
	—	GW3A #976		1		MERCURY TRIP BLANK
	1130	GW3C #980		1		OIL & GREASE LAB QC
1/6/87	1051	GW3C #986	WATER	1	#3	METALS

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/6/87	17:15	[signature]			Private Carrier	1/7/87	1500	[signature]	1/7/87	1500
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II Stg 2 IRP

Project Title Duluth IAP, Mn

Job No. 1016-267

Field Personnel (Signature) Steven J Hynck

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/6/87	1325	GW3B #995	Water	1	#3	Pesticides Lab QC
	1022	GW3C #983		1		Herbicides
	1348	GW3B #996		1		Oil & Grease
	1055	GW3C #984		1		Phenol
	1308	GW3B #1003		3		601 Lab QC (3 Bottles)
	1320	GW3B #1002		3		602 (3 Bottles)
	1312	GW3B #1001		3		601 (3 Bottles)
	0859	GW3A #928		3		602 (3 Bottles)
1/6/87	0904	GW3A #927	Water	3	#3	601 (3 Bottles)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	1/6/87	1715				Private Carrier	1/7/87	1500		1/7/87	1500

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client	USAF PH II STG 2 IRP		Field Personnel (Signature)
Project Title	Duluth IAP, MN	Job No. 1016-267	Steven J Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/6/87	0920	GW3A #972	Water	1	#3	Herbicides Lab QC
	—	GW3A #969		1		Herbicides Trip Blank
	0911	GW3A #974		1		Metals
	0917	GW3A #970		1		Pesticides
	0918	GW3A #925		1		Mercury
	0937	GW3A #973		1		Herbicides Lab QC
	1057	GW3C #982		1		Pesticides
	1327	GW3B #993		1		Phenol Lab QC
	1049	GW3C #988		3		601 Lab QC (3 Bottles)
	1213	GW3A #979		3		601 Field QA Rinse Blank (Bottles)
	1038	GW3C #990		3		602
1/6/87	1045	GW3C #989	Water	3	#3	601

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	1/6/87	17:15				Private Carrier	1/7/87	1500		1/7/87	1500
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF ANG SOS 2 IRP

Field Personnel (Signature)

Project Title DULUTH IAP, MN

Job No. 1016-267

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/7/87	1100	GW3D #1043	Water	1	#3	PHENOL
	—	GW3D #1037	WA	1		METALS TRIP BLANK
	1055	GW3D #1040		1		PESTICIDES
	1045	GW3D #1039		1		METALS
	1052	GW3D #1041		1		HERBICIDES
	—	GW3D #1036		1		METALS TRIP BLANK
	1103	GW3D #1042		1		OIL & GREASE
	1048	GW3D #1038		1		MERCURY
	1524	MW7 #1049		1		OIL & GREASE
	0843	MW7 #1050		1		PHENOL
	0837	MW7 #1046		3		601 LAB QC (3 BOTTLES)
	0828	MW7 #1047		3 (2)	1 Broken	601 (3 BOTTLES)
	0833	MW7 #1048		3		602 (3 BOTTLES)
	1035	GW3D #1045		3		602 (3 BOTTLES)
	1035	GW3D #1044		3		601 (3 BOTTLES)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
	1/7/87	17:45				Private Carrier	1/8/87	1505		1/8/87	1505
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) [signature] Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/7/87	1315	GWBB #1034	Water	1	#8	Pesticides
	1307	GWBB #1031		1		Phenol Duplicate Field QC
	1323	GWBB #1032		1		Oil & Grease
	1323	GWBB #1029		1		Mercury
	1320	GWBB #1035		1		Herbicides
	1305	GWBB #1028		1		Metals Duplicate Field QC
	1308	GWBB #1030		1		Phenols
	1313	GWBB #1027		1		Metals
	1304	GWBB #1033		1		Oil & Grease Duplicate Field QC
	1250	GWBB #1025		3		602 (3 Bottles)
	1250	GWBB #1024		3		601 (3 Bottles)
1/7/87	1250	GWBB #1020	Water	3	#8	601 Field QC Duplicate (3 Bottles)
		GWYB 1026				

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/7/87	17:45	[signature]			Private Carrier	1/8/87	1505	[signature]	1/8/87	1505
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II S 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Steven J. Hynek

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/9/87	1543	GWBC#1068	WATER	1	#8	PHENOL FIELD QC DUPL.
	1538	GWBC#1062		1		MERCURY
	—	GWBA#1085		1		PHENOL TRIP BLANK
	1537	GWBC#1061		1		METALS
	—	GWBA#1086		1		PHENOL TRIP BLANK
	1419	GWBA#1091		1		METALS
	—	GWBA#1084		1		HERBICIDES TRIP BLANK
	1415	GWBA#1090		1		MERCURY
	1551	GWBC#1069		1		HERBCIDE LAB QC
	1530	GWBC#1057		3		601 FIELD QC DUP. (3 BOTTLES)
	1527	GWBC#1058		3		602 (3 BOTTLES)
1/9/87	1530	GWBC#1059	WATER	3	#8	601 (3 BOTTLES)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/9/87	18:15	M. Simpson	1/9/87	1844	Private Carrier	1/10/87	1130	[signature]	1/10/87	1130
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: USAF ANG Seg 2 IRP

Project Title: Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature): Steven J. Hance

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/9/87	—	GWBC #1096	Water	1	#8	Phenol Field QC Rinse Blank
	—	GWBC #1094		1		Herbicide Field QC Rinse Blank
	—	GWBC #1095		1		Oil & Grease Field QC Rinse Blank
	1418	GWBA #1080		1		Phenols
		GWBC #1065		1		Phenols
	1558	GWBC #1067		1		Phenols Field QC Dupl.
	1554	GWBC #1066		1		Oil & Grease
1/9/87	1439	GWBA #1078	Water	1	#8	Pesticide

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/9/87	18:15	M. Simpson	1/9/87	18:15		1/10/87	1130	Lee Davis	1/10/87	1130
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF PH II STG 2 IRP

Project Title DULUTH IAP, MN

Job No. 1017-267

Field Personnel (Signature)

STEVEN J. HYNEK

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/9/87	1427	GWBA #1083	WATER	1	#8	HERBICIDE FIELD QC DUPL.
	1425	GWBA #1082		1		OIL & GREASE FIELD QC DUPL.
	1556	GWBC #1064		1		PESTICIDES
	1431	GWBA #1079		1		HERBICIDE
	1437	GWBA #1081		1		OIL & GREASE
	1553	GWBC #1063		1		HERBICIDE
	1409	GWBA #1089		3		601 FIELD QC DUPL (3 BOTTLES)
	1401	GWBA #1088		3	#8	602 (3 BOTTLES)
	—	#1092		3	—	601 TRIP BLANK ADDITIONAL (3 BOTTLES)
	—	#1093		3	—	602 TRIP BLANK ADDITIONAL (3 BOTTLES)
	1527	GWBC #1060		3	#8	601 FIELD QC DUPL (3 BOTTLES)
1/9/87	1406	GWBA #1087	WATER	3	#8	601 (3 BOTTLES)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/9/87	18:15	M. Simpson	1/9/87	18:15	Private Carrier	1/10/87	1130	[signature]	1/12/87	1130
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client USAF Ph II Stg 2 IRP

Project Title Duluth IAP, MN

Job No. 1016-267

Field Personnel (Signature) Amy Lamberty

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/13	1156	# 1097	H_2O	3	8	602 Lab QC spike (H_2O from a bailer rinse)
1/13	1200	# 1098	"	3	8	602 Lab QC split (H_2O from a bailer rinse)
1/13	1205	# 1099	"	1	8	phenol Field QC bailer rinse

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Lamberty	1/13/87	1220	[illegible]			Private Carrier	1/14/87	1130	[illegible]	1/14/87	1130
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

APPENDIX H

ANALYTICAL REPORTS

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	EPA 8010 (9) EPA 8010 (9)	ug/g ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

Reviewed and Approved by Sam D. Lasley

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 3010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 8010 (9)	ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 8010 (9)	ug/g											
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 8010 (9)	ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 8010 (9)	ug/g											
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	0.017	0.083	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	0.016
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	0.0075
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	0.14
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 8010 (9)	ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 8010 (9)	ug/g											
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	0.38	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	0.0042
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	0.010
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	0.027

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	SS-3B THREE	SS-3C THREE	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	0.0053	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		0.033	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		0.018	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		0.0029	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 8010 (9)	ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 8010 (9)	ug/g											
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		0.0019	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		1.5	0.013	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		0.026	0.0053	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND(5)
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	EPA 8010 (9) EPA 8010 (9)	ug/g ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	0.079	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	0.013	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)									
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND (5)	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	EPA 8010 (9) EPA 8010 (9)	ug/g ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene / trans-1,3-Dichloropropene	EPA 8010 (9) / EPA 8010 (9)	ug/g / ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	0.0070
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	0.024
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 8010 (9)	ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 8010 (9)	ug/g											
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	0.0035	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)										
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	EPA 8010 (9) EPA 8010 (9)	ug/g ug/g	0.0048 (3)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Halocarbons	EPA 8010 (9)	ug/g	MDL (2)			
Bromodichloromethane	EPA 8010 (9)	ug/g	0.0018		ND	ND
Bromoform	EPA 8010 (9)	ug/g	0.0022		ND	ND
Bromomethane	EPA 8010 (9)	ug/g	0.0032		ND	ND
Carbon Tetrachloride	EPA 8010 (9)	ug/g	0.0023		ND	ND
Chlorobenzene	EPA 8010 (9)	ug/g	0.0018		ND	ND
Chloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND
2-Chloroethylvinyl Ether	EPA 8010 (9)	ug/g	0.0022		ND	ND
Chloroform	EPA 8010 (9)	ug/g	0.0022		ND	ND
Chloromethane	EPA 8010 (9)	ug/g	0.0024		ND	ND
Dibromochloromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND
1,2-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0014		ND	ND
1,3-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0021		ND	ND
1,4-Dichlorobenzene	EPA 8010 (9)	ug/g	0.0020		ND	ND
Dichlorodifluoromethane	EPA 8010 (9)	ug/g	0.0016		ND	ND
1,1-Dichloroethane	EPA 8010 (9)	ug/g	0.0025		ND	ND
1,2-Dichloroethane	EPA 8010 (9)	ug/g	0.0022		ND	ND
1,1-Dichloroethene	EPA 8010 (9)	ug/g	0.0025		ND	ND
trans-1,2-Dichloroethene	EPA 8010 (9)	ug/g	0.0021		ND	ND
1,2-Dichloropropane	EPA 8010 (9)	ug/g	0.0010		ND	ND
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	EPA 8010 (9) EPA 8010 (9)	ug/g ug/g	0.0048 (3)		ND	ND
Methylene Chloride	EPA 8010 (9)	ug/g	0.0017		ND	ND
1,1,2,2-Tetrachloroethane	EPA 8010 (9)	ug/g	0.0019		ND	ND
Tetrachloroethene	EPA 8010 (9)	ug/g	0.0019		ND	ND
1,1,1-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND
1,1,2-Trichloroethane	EPA 8010 (9)	ug/g	0.0026		ND	ND
Trichloroethene (TCE)	EPA 8010 (9)	ug/g	0.0030		ND	ND
Trichlorofluoromethane	EPA 8010 (9)	ug/g	0.0022		ND	ND
Vinyl Chloride	EPA 8010 (9)	ug/g	0.0027		ND	ND

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	0.0071	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	0.043	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	0.094	ND	ND	ND	0.10	1.0	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	0.043	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	0.014	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	0.35	ND	0.011	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	0.54	ND	0.0088	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	1.8	ND	0.076	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	0.018	ND	0.018	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	0.057	0.73	0.47	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	0.014
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	SS-3B THREE	SS-3C THREE	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g			ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g			ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	1.6 (5)
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	3.2
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	0.0099	6.4
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	0.21	82.
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)									
Benzene	EPA 8020 (9)	ug/g	0.0013		ND (5)	ND	ND	6.8	ND	0.86	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	170	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		3.5	0.011	ND	21.	2.4	3.5	ND	0.0075
m-Xylene	EPA 8020 (9)	ug/g										
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		30.	0.087	ND	15.	4.9	11.	ND	ND
p-Xylene	EPA 8020 (9)	ug/g										

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)										
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 8020 (9)	ug/g											
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 8020 (9)	ug/g											

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Aromatics	EPA 8020 (9)	ug/g	MDL (2)			
Benzene	EPA 8020 (9)	ug/g	0.0013		ND	ND
Chlorobenzene	EPA 8020 (9)	ug/g	0.0018		ND	ND
1,2-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0023		ND	ND
1,3-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0046		ND	ND
1,4-Dichlorobenzene	EPA 8020 (9)	ug/g	0.0020		ND	ND
Ethylbenzene	EPA 8020 (9)	ug/g	0.0038		ND	ND
Toluene	EPA 8020 (9)	ug/g	0.0032		ND	9.4
m-Xylene	EPA 8020 (9)	ug/g				
o-Xylene	EPA 8020 (9)	ug/g	0.0061(4)		ND	ND
p-Xylene	EPA 8020 (9)	ug/g				

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Pesticides	EPA 3550/8080 (9)	ug/g	MDL (2)									
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	0.02	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	0.02	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		ND	0.02	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		0.10	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Pesticides	EPA 3550/8080 (9)	ug/g	MDL (2)										
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND	0.002
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	ND	ND	0.41	2.1	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND	0.008
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		0.01	ND	ND	0.08	ND	ND	0.10	0.09	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS-3B THREE	SS-3C THREE
Pesticides	EPA 3550/8080 (9)	ug/g	MDL (2)								
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	0.002	ND	ND	ND	ND	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		0.003	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	0.02	ND	ND	ND	ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		0.06	0.04	ND	0.007	ND	ND	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	0.31	0.06	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	1.1	0.17	0.04

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE
Pesticides	EPA 3550/8080 (9)	ug/g	MDL (2)									
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		ND	0.07	ND	ND	ND	ND	0.004	0.07
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Pesticides	EPA 3550/8080 (9)	ug/g	MDL (2)									
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Pesticides	EPA 3550/8080 (9)	ug/g	MDL(2)										
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	ND	ND	0.006	ND	ND	ND	ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	ND	ND	0.007	ND	ND	ND	ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Pesticides	EPA 3550/8080 (9)	ug/g	MDL(2)			
Aldrin	EPA 3550/8080 (9)	ug/g	0.002		ND	ND
alpha-BHC	EPA 3550/8080 (9)	ug/g	0.0008		ND	ND
beta-BHC	EPA 3550/8080 (9)	ug/g	0.0002		ND	ND
delta-BHC	EPA 3550/8080 (9)	ug/g	0.0006		0.001	ND
Lindane	EPA 3550/8080 (9)	ug/g	0.003		ND	ND
Chlordane	EPA 3550/8080 (9)	ug/g	0.05		ND	ND
4,4'-DDD	EPA 3550/8080 (9)	ug/g	0.0004		ND	ND
4,4'-DDE	EPA 3550/8080 (9)	ug/g	0.007		ND	ND
4,4'-DDT	EPA 3550/8080 (9)	ug/g	0.004		ND	ND
Dieldrin	EPA 3550/8080 (9)	ug/g	0.003		ND	ND
Endosulfan I	EPA 3550/8080 (9)	ug/g	0.002		ND	0.01
Endosulfan II	EPA 3550/8080 (9)	ug/g	0.001		ND	ND
Endosulfan Sulfate	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Endrin	EPA 3550/8080 (9)	ug/g	0.005		ND	ND
Endrin Aldehyde	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Heptachlor	EPA 3550/8080 (9)	ug/g	0.004		ND	ND
Heptachlor Epoxide	EPA 3550/8080 (9)	ug/g	0.002		ND	ND
Toxaphene	EPA 3550/8080 (9)	ug/g	0.14		ND	ND
Arochlor 1016	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Arochlor 1221	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Arochlor 1232	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Arochlor 1242	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Arochlor 1248	EPA 3550/8080 (9)	ug/g	0.02		ND	ND
Arochlor 1254	EPA 3550/8080 (9)	ug/g	0.02		ND	0.52
Arochlor 1260	EPA 3550/8080 (9)	ug/g	0.02		ND	ND

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Herbicides	EPA 8150* (9)	ug/g	MDL (2)									
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		12.	40.	29.	11.	10.	9.	44.	19.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		590	190	110	ND	ND	7.	870	67.
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		11.	16.	16.	17.	13.	8.	21.	18.
Barium	EPA 200.7 (7)	ug/g	20.		46.	120	120	64.	31.	24.	80.	37.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND	6.	ND	ND	ND	1.8	ND
Chromium	EPA 200.7 (7)	ug/g	5.		13.	28.	17.	21.	9.	16.	21.	11.
Lead	EPA 200.7 (7)	ug/g	2.		ND	200	79.	ND	ND	ND	70.	ND
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND(16)	ND	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND

*** Revised 07/10/87**

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Herbicides	EPA 8150* (9)	ug/g	MDL(2)										
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		9.	10.	9.	17.	19.	13.	27.	20.	13.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		8800	7200	1600	190	90	50	1100	ND	ND
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		ND	ND	ND (12)	ND	ND	ND	ND	ND	ND
Barium	EPA 200.7 (7)	ug/g	20.		39.	45.	45.	54.	49.	34.	48.	39.	29.
Cadmium	EPA 200.7 (7)	ug/g	1		ND	ND	ND	ND	ND	ND	2.	ND	ND.
Chromium	EPA 200.7 (7)	ug/g	5.		22.	20.	20.	20.	25.	26.	17.	23.	15.
Lead	EPA 200.7 (7)	ug/g	2.		ND	ND	ND	ND	ND	ND	17.	ND	ND
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND	ND	ND (16)	ND	ND	ND	ND	ND	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS=3B THREE	SS-3C THREE
Herbicides	EPA 8150* (9)	ug/g	MDL(2)								
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		16.	14.	30.	48.	68.	24.	18.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		220	ND	90.	1700	1200	270	30.
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		ND (15)	ND (12)	ND (15)	ND (15)	19.	14.	16.
Barium	EPA 200.7 (7)	ug/g	20.		44.	35.	50.	65.	100	51.	37.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	7.	3.	1.
Chromium	EPA 200.7 (7)	ug/g	5.		19.	24.	17.	20.	25.	20.	16.
Lead	EPA 200.7 (7)	ug/g	2.		ND	ND	ND	ND	77.	5.7	ND
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	0.1	ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND (5)	ND (16)	ND (5)	ND (5)	ND	ND	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW-5A 5-6.5 FIVE	GW-5B 9.5-11 FIVE	GW-5C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE
Herbicides	EPA 8150* (9)	ug/g	MDL(2)									
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9'	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		12.	7.	15.	18.	23.	35.	26.	25.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		ND	49.	45.	87.	9.	170	48.	77.
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		12.	ND (14)	8.	ND (14)	ND (14)	9.	9.	8.
Barium	EPA 200.7 (7)	ug/g	20.		80.	26.	47.	320	41.	53.	42.	42.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	1.4	ND	ND	ND	ND
Chromium	EPA 200.7 (7)	ug/g	5.		33.	21.	31.	39.	21.	30.	25.	26.
Lead	EPA 200.7 (7)	ug/g	2.		ND	ND	ND	ND	ND	ND	ND	ND
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND (16)	ND	ND	ND	ND	ND	ND	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Herbicides	EPA 8150* (9)	ug/g	MDL(2)									
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		45.	23.	34.	17.	18.	18.	9.	91.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		20.	ND	ND	ND	63.	ND	ND	620
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		ND	ND	ND	ND	8.	13.	2.	ND (15)
Barium	EPA 200.7 (7)	ug/g	20.		61.	56.	380	80.	33.	46.	26.	23.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND
Chromium	EPA 200.7 (7)	ug/g	5.		18.	34.	25.	21.	20.	26.	17.	ND
Lead	EPA 200.7 (7)	ug/g	2.		ND	ND	ND	ND	ND	ND	ND	6.8
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND	ND	0.2
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND	ND (5)	ND	ND	ND (16)	ND (16)	ND	ND (5)
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND

*** Revised 07/10/87**

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Herbicides	EPA 8150* (9)	ug/g	MDL(2)										
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
Moisture	EPA 160.3 (6)	%	1.		15.	12.	14.	15.	9.	15.	22.	10.	9.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		300	ND	ND	80.	40.	140	ND	ND	160
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		ND (15)	ND	ND	ND	ND	ND	ND	ND	ND
Barium	EPA 200.7 (7)	ug/g	20.		170	64.	73.	41.	23.	43.	55.	29.	57.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	EPA 200.7 (7)	ug/g	5.		18.	31.	34.	17.	7.	20.	26.	12.	25.
Lead	EPA 200.7 (7)	ug/g	2.		ND	ND	ND	15.	ND	ND	ND	ND	ND
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND (16)	ND	ND	ND	ND	ND	ND	ND	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Herbicides	EPA 8150* (9)	ug/g	MDL(2)			
2,4,5-T	EPA 8150* (9)	ug/g	0.10		ND	ND
2,4-D	EPA 8150* (9)	ug/g	0.02		ND	ND
Silvex	EPA 8150* (9)	ug/g	0.20		ND	ND
Moisture	EPA 160.3 (6)	%	1.		33.	77.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		70.	730
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND
Arsenic	EPA 3050/7060 (7)	ug/g	1.		ND (15)	ND
Barium	EPA 200.7 (7)	ug/g	20.		47.	24.
Cadmium	EPA 200.7 (7)	ug/g	1.		ND	ND
Chromium	EPA 200.7 (7)	ug/g	5.		18.	11.
Lead	EPA 200.7 (7)	ug/g	2.		ND	43.
Mercury	EPA 7471 (7)	ug/g	0.1		ND	ND
Selenium	EPA 3050/7740 (7)	ug/g	0.1		ND (5)	ND
Silver	EPA 200.7 (7)	ug/g	1.		ND	ND

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B2-B 0-1.5 TWO	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO
Moisture	EPA 160.3 (6)	%	1.		17.	14.	13.	8.	6.	10.	13.	15.	14.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		ND	ND	21.	9400	2000	1700	6.	410	6.
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	0.5	5.5	0.6	ND	ND	30.	ND	90.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-D 15-16.5 TWO	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Moisture	EPA 160.3 (6)	%	1.		14.	11.	53.	28.	45.	74.	75.	64.	74.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		46.	7.	1200	220	560	1700	510	300	1700
Phenolics	EPA 420.2 (7)	ug/g	0.4		ND	ND	ND	ND	ND				

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR
Moisture	EPA 160.3 (6)	%	1.		57.	13.	37.	17.	22.	14.	20.	18.	15.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		580	24.	340	40.	ND	90.	430	90.	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW4-A* 10-11.5* FOUR *	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR
Moisture	EPA 160.3 (6)	%	1.		12.	60.	57.	15.	62.	12.*	44.	27.	73.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		ND	480	10000	2400	960	580*	130	70	940

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX	B6-B 2.5-4 SIX
Moisture	EPA 160.3 (6)	%	1.		22.	19.	19.	19.
Oil & Grease	EPA 413.2 (7)	ug/g	5.		ND	ND	810	ND
Ethylene Glycol	NIOSH P&CAM 338 (8)	ug/g	0.9		ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	Drum 421 TWO	Drum 422 THREE	0-2.5 462 FOUR	0-2.5 459 EIGHT	Drum GW8-C EIGHT
Ignitability	EPA 1010 (9)	NA	Y/N		N	N	N	N	N
Arsenic	EPA 1310/7060 (9)	mg/L	0.01		ND	ND	ND	ND	ND (15)
Barium	EPA 1310/7080 (9)	mg/L	0.1		0.1	ND	0.1	0.1	ND
Cadmium	EPA 1310/7130 (9)	mg/L	0.01		ND	ND	ND	ND	ND
Chromium	EPA 1310/7190 (9)	mg/L	0.05		ND	N	ND	ND	ND
Lead	EPA 1310/7421 (9)	mg/L	0.05		ND	ND	ND	ND	ND
Mercury	EPA 1310/7470 (9)	mg/L	0.001		ND	ND	ND	ND	ND
Selenium	EPA 1310/7740 (9)	mg/L	0.01		ND	ND	ND	ND	ND (15)
Silver	EPA 1310/7760 (9)	mg/L	0.01		ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

UBTL ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND	ND	2.9	ND	ND	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	NC	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		13.	66.	ND	ND	2.6	2.3	ND	ND	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	20.	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	4.4	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	0.87	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND	ND	1.0	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	0.88	ND	ND	ND	ND	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	3.6	ND	2.3	ND	1.6	1.4
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	0.70	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	310	83.	97.	6.8	36.	37.
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	4.7	ND	1.9	ND	3.0	2.8
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	1900	83.	1400	25.	1400	970
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	9.1	6.0	4.8	3.0
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	30.	0.69	47.	5.7	35.	26.
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	35.	260	68.	82.	70.	55.
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	ND	ND	4.4	31.	4.4	740	570	350
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	490	430	1000	10.	10.	8.1
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	ND	ND	ND	2.1	2.3	2.8	3.5	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	5.5
Chloroform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND	ND	ND	19.	10.	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	4.0	4.4	2.2	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	ND	ND	ND	ND	22.	16.	9.6	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	0.98	2.2	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	1.9	ND	ND	ND	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	5.8	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)										
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	2.5	ND	ND	ND	2.8	ND	ND	ND
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	2.9	ND	ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	1.2	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	7.0	ND	ND	ND	ND	ND	ND	ND
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	0.82	ND	0.83	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	7.2	ND	ND	ND	ND	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	220.	1.1	5.1	ND	ND	ND	ND	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	7.6	ND	ND	ND	ND	ND
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK THREE
Purgeable Halocarbons	EPA 601 (1)	ug/L	MDL (2)					
Chloromethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND
Methylene Chloride	EPA 601 (1)	ug/L	0.34		ND	ND	ND	35.
Carbon Tetrachloride	EPA 601 (1)	ug/L	0.46		ND	ND	ND	ND
Bromodichloromethane	EPA 601 (1)	ug/L	0.35		ND	ND	ND	1.5
Dibromochloromethane	EPA 601 (1)	ug/L	0.31		ND	ND	ND	ND
Bromomethane	EPA 601 (1)	ug/L	0.63		ND	ND	ND	ND
Dichlorodifluoromethane	EPA 601 (1)	ug/L	0.33		ND	ND	ND	ND
Trichlorofluoromethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND
Chloroform	EPA 601 (1)	ug/L	0.45		ND	5.4	ND	9.8
Bromoform	EPA 601 (1)	ug/L	0.45		ND	ND	ND	ND
Chloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND
1,1-Dichloroethane	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND
1,2-Dichloroethane	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND
1,1,1-Trichloroethane	EPA 601 (1)	ug/L	0.53		ND	ND	ND	ND
1,1,2-Trichloroethane	EPA 601 (1)	ug/L	0.51		ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	EPA 601 (1)	ug/L	0.38		ND	ND	ND	ND
Vinyl Chloride	EPA 601 (1)	ug/L	0.54		ND	ND	ND	ND
1,1-Dichloroethene	EPA 601 (1)	ug/L	0.49		ND	ND	ND	ND
trans-1,2-Dichloroethene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND
Trichloroethene	EPA 601 (1)	ug/L	0.60		ND	ND	ND	ND
Tetrachloroethene	EPA 601 (1)	ug/L	0.38		ND	ND	ND	0.52
1,2-Dichloropropane	EPA 601 (1)	ug/L	0.20		ND	ND	ND	ND
cis-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.58		ND	ND	ND	ND
trans-1,3-Dichloropropene	EPA 601 (1)	ug/L	0.39		ND	ND	ND	ND
2-Chloroethylvinyl Ether	EPA 601 (1)	ug/L	0.44		ND	ND	ND	ND
Chlorobenzene	EPA 601 (1)	ug/L	0.37		ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 601 (1)	ug/L	0.29		ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 601 (1)	ug/L	0.42		ND	ND	ND	ND
1,4-Dichlorobenzene	EPA 601 (1)	ug/L	0.41		ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	36.	ND	ND	ND	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	15.	89.	6.8	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND	ND	ND	2.0	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	73.	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	1.6	2.8	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)										
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	6.5
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK FIVE
Purgeable Aromatics	EPA 602 (1)	ug/L	MDL (2)					
Benzene	EPA 602 (1)	ug/L	0.25		ND	ND	ND	ND
Toluene	EPA 602 (1)	ug/L	0.64		ND	ND	ND	ND
Ethylbenzene	EPA 602 (1)	ug/L	0.75		ND	ND	ND	ND
o-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND
m-Xylene	EPA 602 (1)	ug/L	0.45		ND	ND	ND	ND
p-Xylene	EPA 602 (1)	ug/L	0.78		ND	ND	ND	ND
Chlorobenzene	EPA 602 (1)	ug/L	0.35		ND	ND	ND	ND
1,2-Dichlorobenzene	EPA 602 (1)	ug/L	0.47		ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.93		ND	ND	ND	ND
1,3-Dichlorobenzene	EPA 602 (1)	ug/L	0.44		ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit		Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)										
Aldrin	EPA 608 (1)	ug/L	0.007	0.02		ND	ND	ND	ND	ND (†)	ND (†)	ND	ND	ND
alpha-BHC	EPA 608 (1)	ug/L	0.006	0.004		ND	ND	ND	ND	0.01	0.02	ND	ND	ND
beta-BHC	EPA 608 (1)	ug/L	0.006	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 608 (1)	ug/L	0.002	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 608 (1)	ug/L	0.005	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 608 (1)	ug/L	0.01	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 608 (1)	ug/L	0.004	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 608 (1)	ug/L	0.005	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 608 (1)	ug/L	0.03	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 608 (1)	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 608 (1)	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 608 (1)	ug/L	0.01	0.012		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 608 (1)	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 608 (1)	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 608 (1)	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 608 (1)	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND

(†) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by †.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit		Field #: / Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE*	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)										
Aldrin	EPA 608 (1)	ug/L	0.007	0.02		ND	ND (†)	ND (†)	ND (†)	ND	ND	ND	ND (B)	ND (B)
alpha-BHC	EPA 608 (1)	ug/L	0.006	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 608 (1)	ug/L	0.006	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 608 (1)	ug/L	0.002	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 608 (1)	ug/L	0.005	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 608 (1)	ug/L	0.01	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 608 (1)	ug/L	0.004	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	EPA 608 (1)	ug/L	0.005	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 608 (1)	ug/L	0.03	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 608 (1)	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 608 (1)	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 608 (1)	ug/L	0.01	0.012		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 608 (1)	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 608 (1)	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 608 (1)	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 608 (1)	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND

* Revised 07/10/87

(†) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by †.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit MDL (2)	Detection Limit MDL (†)	Field #: / Site :	SW-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)										
Aldrin	EPA 608 (1)	ug/L	0.007	0.02		ND	ND	ND	ND	ND (†)	ND	ND	ND	ND (†)
alpha-BHC	EPA 608 (1)	ug/L	0.006	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	EPA 608 (1)	ug/L	0.006	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	EPA 608 (1)	ug/L	0.002	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane	EPA 608 (1)	ug/L	0.005	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	EPA 608 (1)	ug/L	0.01	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	EPA 608 (1)	ug/L	0.004	0.003		ND	ND	ND	ND	ND	ND	ND	ND	0.009
4,4'-DDE	EPA 608 (1)	ug/L	0.005	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	EPA 608 (1)	ug/L	0.03	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	EPA 608 (1)	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	EPA 608 (1)	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	EPA 608 (1)	ug/L	0.01	0.012		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	EPA 608 (1)	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	EPA 608 (1)	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	EPA 608 (1)	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	EPA 608 (1)	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND

(†) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by †.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit		Field #: Site :	SW-8B EIGHT	TRIP BLANK ONE	TRIP BLANK SEVEN
Pesticides	EPA 608 (1)	ug/L	MDL (2)	MDL (†)				
Aldrin	EPA 608 (1)	ug/L	0.007	0.02		ND (†)	ND	ND
alpha-BHC	EPA 608 (1)	ug/L	0.006	0.004		ND	ND	ND
beta-BHC	EPA 608 (1)	ug/L	0.006	0.005		ND	ND	ND
delta-BHC	EPA 608 (1)	ug/L	0.002	0.006		ND	ND	ND
Lindane	EPA 608 (1)	ug/L	0.005	0.005		ND	ND	ND
Chlordane	EPA 608 (1)	ug/L	0.01	0.05		ND	ND	ND
4,4'-DDD	EPA 608 (1)	ug/L	0.004	0.003		.003*	ND	ND
4,4'-DDE	EPA 608 (1)	ug/L	0.005	0.006		ND	ND	ND
4,4'-DDT	EPA 608 (1)	ug/L	0.03	0.01		0.01	ND	ND
Dieldrin	EPA 608 (1)	ug/L	0.005	0.002		ND	ND	ND
Endosulfan I	EPA 608 (1)	ug/L	0.01	0.036		ND	ND	ND
Endosulfan II	EPA 608 (1)	ug/L	0.01	0.012		ND	ND	ND
Endosulfan Sulfate	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND
Endrin	EPA 608 (1)	ug/L	0.006	0.02		ND	ND	ND
Endrin Aldehyde	EPA 608 (1)	ug/L	0.01	0.01		ND	ND	ND
Heptachlor	EPA 608 (1)	ug/L	0.007	0.005		ND	ND	ND
Heptachlor Epoxide	EPA 608 (1)	ug/L	0.006	0.002		ND	ND	ND
Toxaphene	EPA 608 (1)	ug/L	0.25	0.25		ND	ND	ND
Arochlor 1016	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1221	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1232	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1242	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1248	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1254	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND
Arochlor 1260	EPA 608 (1)	ug/L	0.09	0.09		ND	ND	ND

* Revised 07/10/87

(†) This group of samples was analyzed on two instruments. Data collected from the second instrument is indicated by †.

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DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Herbicides	EPA 615 (1)	ug/L	MDL (2)										
2,4,5-T	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Herbicides	EPA 615 (1)	ug/L	MDL (2)										
2,4,5-T	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Herbicides	E'A 615 (1)	ug/L	MDL (2)										
2,4,5-T	EPA 615 (1)	ug/L	0.08		ND	0.08	ND	ND	ND	ND	ND	ND	ND
2,4-D	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	SW-8B EIGHT	TRIP BLANK ONE	TRIP BLANK THREE	TRIP BLANK EIGHT
Herbicides	EPA 615 (1)	ug/L	MDL (2)					
2,4,5-T	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND
2,4-D	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND
Silvex	EPA 615 (1)	ug/L	0.08		ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Oil and Grease	EPA 413.2 (7)	mg/L	1.		ND	ND	ND	ND	ND	ND	ND	2.	ND
Phenolics	EPA 420.2 (7)	ug/L	5.		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01		ND (15)	ND (15)	ND (15)	ND (15)	ND	ND			
Barium	EPA 208.1 (7)	mg/L	0.2		1.2	1.2	0.2	0.2	ND	ND			
Cadmium	EPA 213.1 (7)	mg/L	0.01		0.01	0.02	ND	ND	ND	ND			
Chromium	EPA 218.1 (7)	mg/L	0.05		1.3	0.64	0.22	0.08	ND	ND			
Lead	EPA 239.2 (7)	mg/L	0.02		0.06	0.03	ND (13)	ND (13)	ND	ND			
Mercury	EPA 245.1 (7)	mg/L	0.001		0.001	ND	ND	ND	ND	ND			
Selenium	EPA 270.2 (7)	mg/L	0.01		ND (15)	ND (15)	ND (15)	ND (15)	ND (15)	ND (15)			
Silver	EPA 272.1 (7)	mg/L	0.01		0.03	0.02	ND	ND	ND	ND			

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Oil and Grease	EPA 413.2 (7)	mg/L	1.		ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenolics	EPA 420.2 (7)	ug/L	5.		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01										
Barium	EPA 208.1 (7)	mg/L	0.2										
Cadmium	EPA 213.1 (7)	mg/L	0.01										
Chromium	EPA 218.1 (7)	mg/L	0.05										
Lead	EPA 239.2 (7)	mg/L	0.02										
Mercury	EPA 245.1 (7)	mg/L	0.001										
Selenium	EPA 270.2 (7)	mg/L	0.01										
Silver	EPA 272.1 (7)	mg/L	0.01										

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Oil and Grease	EPA 413.2 (7)	mg/L	1.		ND	ND	ND	ND	ND	ND	1.	ND	ND
Phenolics	EPA 420.2 (7)	ug/L	5.		ND	ND	ND	16.	12.	ND	ND	ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01				ND (13)	ND (13)	ND (13)	ND (13)	ND	0.02	ND
Barium	EPA 208.1 (7)	mg/L	0.2				0.4	1.	ND	0.5	ND	0.6	0.1
Cadmium	EPA 213.1 (7)	mg/L	0.01				ND	ND	ND	ND	ND	0.14	0.06
Chromium	EPA 218.1 (7)	mg/L	0.05				0.30	0.71	0.01	0.20	ND	0.20	ND
Lead	EPA 239.2 (7)	mg/L	0.02				ND	0.03	ND	ND	0.04	0.76	0.14
Mercury	EPA 245.1 (7)	mg/L	0.001				ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 270.2 (7)	mg/L	0.01				ND	ND	ND	ND	ND (15)	ND (15)	ND (15)
Silver	EPA 272.1 (7)	mg/L	0.01				ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW-4A FOUR	GW-4B FOUR	GW-4C FOUR	GW-4D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Oil and Grease	EPA 413.2 (7)	mg/L	1.		ND	ND	ND	ND	ND	1.	2.	ND	ND
Phenolics	EPA 420.2 (7)	ug/L	5.										
Arsenic	EPA 206.2 (7)	mg/L	0.01										
Barium	EPA 208.1 (7)	mg/L	0.2										
Cadmium	EPA 213.1 (7)	mg/L	0.01										
Chromium	EPA 218.1 (7)	mg/L	0.05										
Lead	EPA 239.2 (7)	mg/L	0.02										
Mercury	EPA 245.1 (7)	mg/L	0.001										
Selenium	EPA 270.2 (7)	mg/L	0.01										
Silver	EPA 272.1 (7)	mg/L	0.01										

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	S2-5C FIVE
Oil and Grease	EPA 413.2 (7)	mg/L	1.		2.	ND	ND	ND	ND	ND	ND	ND	ND
Phenolics	EPA 420.2 (7)	ug/L	5.					ND	ND	ND	ND	ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01					ND (15)	ND (15)	ND (15)	ND (15)	ND (15)	ND (15)
Barium	EPA 208.1 (7)	mg/L	0.2					ND	ND	ND	ND	ND	ND
Cadmium	EPA 213.1 (7)	mg/L	0.01					ND	ND	ND	ND	ND	ND
Chromium	EPA 218.1 (7)	mg/L	0.05					ND	ND	ND	ND	ND	ND
Lead	EPA 239.2 (7)	mg/L	0.02					ND (13)	ND (13)	ND (13)	ND	ND	ND
Mercury	EPA 245.1 (7)	mg/L	0.001					ND	ND	ND	ND	ND	ND
Selenium	EPA 270.2 (7)	mg/L	0.01					ND (15)	ND (15)	ND (15)	ND (15)	ND (15)	ND (15)
Silver	EPA 272.1 (7)	mg/L	0.01					ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Oil and Grease	EPA 413.2 (7)	mg/L	1.		ND	ND	ND	1.	ND	ND	ND	ND	7.
Phenolics	EPA 420.2 (7)	ug/L	5.		ND	ND	28.	ND	ND	ND	ND	ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01		ND (15)	ND (15)	ND	ND (15)	ND (13)	ND (13)	ND (13)	ND (15)	ND (15)
Barium	EPA 208.1 (7)	mg/L	0.2		0.5	0.5	ND	ND	0.3	0.5	1.0	ND	ND
Cadmium	EPA 213.1 (7)	mg/L	0.01		ND	ND	0.02	ND	ND	ND	ND	ND	ND
Chromium	EPA 218.1 (7)	mg/L	0.05		0.11	0.32	ND	ND	0.10	0.30	0.52	ND	ND
Lead	EPA 239.2 (7)	mg/L	0.02		ND (13)	0.11	ND	ND	ND	ND	ND	0.04	0.03
Mercury	EPA 245.1 (7)	mg/L	0.001		ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	EPA 270.2 (7)	mg/L	0.01		ND (15)	ND (15)	ND	ND (15)	ND	ND	ND	ND (15)	ND (15)
Silver	EPA 272.1 (7)	mg/L	0.01		ND	0.01	ND	ND	ND	ND	ND	ND	ND

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: / Site :	TRIP BLANK FIVE	TRIP BLANK THREE	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	TRIP BLANK THREE	BAILER RINSE SEVEN	RINSE BLANK EIGHT	BAILER RINSE EIGHT
Oil and Grease	EPA 413.2 (7)	mg/L	1.				ND					ND	
Phenolics	EPA 420.2 (7)	ug/L	5.					ND	ND			ND	ND
Arsenic	EPA 206.2 (7)	mg/L	0.01			ND (13)					ND		
Barium	EPA 208.1 (7)	mg/L	0.2			ND					ND		
Cadmium	EPA 213.1 (7)	mg/L	0.01			ND					ND		
Chromium	EPA 218.1 (7)	mg/L	0.05			ND					ND		
Lead	EPA 239.2 (7)	mg/L	0.02			ND					ND		
Mercury	EPA 245.1 (7)	mg/L	0.001		ND	ND		ND		ND	ND		
Selenium	EPA 270.2 (7)	mg/L	0.01			ND					ND		
Silver	EPA 272.1 (7)	mg/L	0.01			ND					ND		

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Field #: Site :	GW10-A TEN	GW10-B TEN	GW10-C TEN
Radiology							
Gross Alpha	Std. Method 703 (11)	pCi/L	1.		8 ± 6	18 ± 8	8 ± 5
Gross Beta	Std. Method 703 (11)	pCi/L	1.		6 ± 3	12 ± 3	9 ± 3
Radium-226	Std. Method 706 (11)	pCi/L	0.6		3.4 ± 2.0	5.0 ± 2.8	ND
Radium-228	Std. Method 708 (11)	pCi/L	1.		ND	ND	ND

Footnotes - Analytical Report

(1) "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," Federal Register, Volume 49, Number 209, October 26, 1984.
(2) Determined according to the procedure documented in Federal Register, October 26, 1984, Part VIII.
(3) Combined analysis of cis and trans isomers with listed detection limit.
(4) Combined analysis of meta, ortho, and para isomers which listed detection limit.
(5) Sample diluted 1:100 for analysis with corresponding increase in detection limit.
(6) "Laboratory Determination of Moisture Content of Soil," ASTM 02216-71.
(7) "Methods for Chemical Analysis of Water and Wastes," EPA Manual 600/4-79-020, USEPA, March, 1983.
(8) "Manual of Analytical Methods, Third Edition", NIOSH 84-100, 1985, (Modified)
(9) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA SW-846, Second Edition, USEPA, 1982.
(11) "Standard Methods for Examination of Water and Wastewater," 16th Edition, American Public Health Associates, 1985.
(12) Sample diluted 1:3 for analysis with corresponding increase in detection limit.
(13) Sample diluted 1:5 for analysis with corresponding increase in detection limit.
(14) Sample diluted 1:8 for analysis with corresponding increase in detection limit.
(15) Sample diluted 1:10 for analysis with corresponding increase in detection limit.
(16) Sample diluted 1:30 for analysis with corresponding increase in detection limit.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Holding Time Summary

Parameter	Method(*)	Field #: / Site :	B1-A 0-1.5 ONE	B1-A* 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
SAMPLING DATE			11/19/86	11/19/86	11/19/86	11/18/86	11/19/86	11/20/86	11/23/86	11/23/86	11/12/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			11/24/86	11/24/86	11/24/86	11/24/86	11/24/86	12/04/86	12/01/86	12/01/86	11/23/86
Elapsed Time			5 days	5 days	5 days	6 days	5 days	14 days	8 days	8 days	11 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			11/24/86	11/24/86	11/24/86	11/24/86	11/24/86	12/04/86	12/01/86	12/01/86	11/23/86
Elapsed Time			5 days	5 days	5 days	6 days	5 days	14 days	8 days	8 days	11 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted			11/27/86	11/27/86	11/27/86	11/27/86	11/27/86	11/26/86	11/30/86	11/30/86	
Elapsed Time			8 days	8 days	8 days	9 days	8 days	6 days	7 days	7 days	
Date Analyzed			12/01/86	12/01/86	12/01/86	12/01/86	12/01/86	12/01/86	12/05/86	12/05/86	
Elapsed Time			4 days	4 days	4 days	4 days	4 days	5 days	5 days	5 days	
Herbicides	EPA 3550/8150										
Date Extracted			11/26/86	11/26/86	11/26/86	11/26/86	11/26/86	11/26/86	11/28/86	11/28/86	
Elapsed Time			7 days	7 days	7 days	8 days	7 days	6 days	5 days	5 days	
Date Analyzed			12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/23/86	12/23/86	
Elapsed Time			26 days	26 days	26 days	26 days	26 days	26 days	25 days	25 days	
Moisture	EPA 160.3										
Date Analyzed			12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/02/86	12/02/86	12/02/86	11/24/86
Elapsed Time			22 days	22 days	22 days	23 days	22 days	12 days	9 days	9 days	12 days

*** Revised 07/10/87**

(*) Methods documented in previous Analytical Report section.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.-5 TWO	GW2-D 15-16.5 TWO
SAMPLING DATE			11/12/86	11/12/86	11/17/86	11/17/86	11/17/86	11/13/86	11/14/86	11/14/86	11/17/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			11/23/86	11/23/86	11/25/86	11/25/86	11/25/86	11/23/86	11/23/86	11/23/86	11/25/86
Elapsed Time			11 days	11 days	8 days	8 days	8 days	10 days	9 days	9 days	8 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			11/23/86	11/23/86	11/25/86	11/25/86	11/25/86	11/23/86	11/23/86	11/23/86	11/25/86
Elapsed Time			11 days	11 days	8 days	8 days	8 days	10 days	9 days	9 days	8 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Herbicides	EPA 3550/8150										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Moisture	EPA 160.3										
Date Analyzed			11/24/86	11/24/86	12/02/86	12/02/86	12/02/86	11/24/86	11/24/86	11/24/86	12/02/86
Elapsed Time			12 days	12 days	15 days	15 days	15 days	11 days	10 days	10 days	15 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
SAMPLING DATE			11/17/86	11/22/86	11/22/86	11/22/86	11/25/86	11/25/86	11/25/86	11/25/86	11/25/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			11/25/86	12/01/86	12/01/86	12/01/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86
Elapsed Time			8 days	9 days	9 days	9 days	11 days	11 days	11 days	11 days	11 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			11/25/86	12/01/86	12/01/86	12/01/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86
Elapsed Time			8 days	9 days	9 days	9 days	11 days	11 days	11 days	11 days	11 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted							12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Elapsed Time							7 days	7 days	7 days	7 days	7 days
Date Analyzed							12/05/86	12/05/86	12/05/86	12/05/86	12/05/86
Elapsed Time							3 days	3 days	3 days	3 days	3 days
Herbicides	EPA 3550/8150										
Date Extracted							12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Elapsed Time							7 days	7 days	7 days	7 days	7 days
Date Analyzed							12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Elapsed Time							23 days	23 days	23 days	23 days	23 days
Moisture	EPA 160.3										
Date Analyzed			12/02/86	12/02/86	12/02/86	12/02/86	12/22/86	12/22/86	12/22/85	12/22/86	12/22/86
Elapsed Time			15 days	10 days	10 days	10 days	27 days	27 days	27 days	27 days	27 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
SAMPLING DATE			11/25/86	11/25/86	11/25/86	11/25/86	12/01/86	11/26/86	12/02/86*	12/02/86*	11/22/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			12/06/86	12/06/86	12/06/86	12/06/86	12/10/86	12/06/86	12/10/86	12/10/86	12/02/86
Elapsed Time			11 days	11 days	11 days	11 days	9 days	10 days	8 days*	8 days*	10 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			12/06/86	12/06/86	12/06/86	12/06/68	12/10/86	12/06/86	12/10/86	12/10/86	12/02/86
Elapsed Time			11 days	11 days	11 days	11 days	9 days	10 days	8 days*	8 days*	10 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted			12/02/86	12/02/86	12/02/86	12/02/86	12/08/86	12/02/86	12/08/86	12/08/86	11/29/86
Elapsed Time			7 days	7 days	7 days	7 days	7 days	6 days	6 days*	6 days*	7 days
Date Analyzed			12/05/86	12/05/86	12/05/86	12/05/86	12/14/86	12/05/86	12/14/86	12/14/86	12/05/86
Elapsed Time			3 days	3 days	3 days	3 days	6 days	3 days	5 days*	5 days*	6 days
Herbicides	EPA 3550/8150										
Date Extracted			12/02/86	12/02/86	12/02/86	12/02/86	12/08/86	12/02/86	12/08/86	12/08/86	11/28/86
Elapsed Time			7 days	7 days	7 days	7 days	7 days	6 days	6 days*	6 days*	6 days
Date Analyzed			12/25/86	12/25/86	12/25/86	12/25/86	12/28/86	12/25/86	12/28/86	12/28/86	12/23/86
Elapsed Time			23 days	23 days	23 days	23 days	20 days	23 days	19 days*	19 days*	25 days
Moisture	EPA 160.3										
Date Analyzed			12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/02/86
Elapsed Time			27 days	27 days	27 days	27 days	21 days	26 days	20 days*	20 days*	10 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	SS-3B THREE	SS-3C THREE	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR
SAMPLING DATE			11/22/86	11/22/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Purgeable Halocarbons	EPA 8010									
Date Analyzed			12/02/86	12/02/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86
Elapsed Time			10 days	10 days	9 days	9 days	9 days	9 days	9 days	9 days
Purgeable Aromatics	EPA 8020									
Date Analyzed			12/02/86	12/02/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86
Elapsed Time			10 days	10 days	9 days	9 days	9 days	9 days	9 days	9 days
Pesticides/PCBs	EPA 3550/8080									
Date Extracted			11/29/86	11/29/86						
Elapsed Time			7 days	7 days						
Date Analyzed			12/05/86	12/05/86						
Elapsed Time			6 days	6 days						
Herbicides	EPA 3550/8150									
Date Extracted			11/28/86	11/28/86						
Elapsed Time			6 days	6 days						
Date Analyzed			12/23/86	12/23/86						
Elapsed Time			25 days	25 days						
Moisture	EPA 160.3									
Date Analyzed			12/02/86	12/02/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86
Elapsed Time			10 days	10 days	20 days	20 days	20 days	20 days	20 days	20 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR
SAMPLING DATE			12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/05/86	12/05/86	12/02/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/13/86	12/13/86	12/11/86
Elapsed Time			8 days	8 days	8 days	8 days	8 days	8 days	8 days	8 days	9 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/13/86	12/13/86	12/11/86
Elapsed Time			8 days	8 days	8 days	8 days	8 days	8 days	8 days	8 days	9 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Herbicides	EPA 3550/8150										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Moisture	EPA 160.3										
Date Analyzed			12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86
Elapsed Time			18 days	18 days	18 days	18 days	18 days	18 days	17 days	17 days	20 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
SAMPLING DATE			12/03/86	12/03/86	12/03/86	11/23/86	11/23/86	11/23/86	11/23/86	11/21/86	11/21/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			12/10/86	12/10/86	12/10/86	12/03/86	12/03/86	12/03/86	12/03/86	12/04/86	12/04/86
Elapsed Time			7 days	7 days	7 days	10 days	10 days	10 days	10 days	13 days	13 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			12/10/86	12/10/86	12/10/86	12/03/86	12/03/86	12/03/86	12/03/86	12/04/86	12/04/86
Elapsed Time			7 days	7 days	7 days	10 days	10 days	10 days	10 days	13 days	13 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted										11/26/86	11/26/86
Elapsed Time										5 days	5 days
Date Analyzed										12/01/86	12/01/86
Elapsed Time										5 days	5 days
Herbicides	EPA 3550/8150										
Date Extracted										11/28/86	11/28/86
Elapsed Time										7 days	7 days
Date Analyzed										12/23/86	12/23/86
Elapsed Time										25 days	25 days
Moisture	EPA 160.3										
Date Analyzed			12/22/86	12/22/86	12/22/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Elapsed Time			19 days	19 days	19 days	9 days	9 days	9 days	9 days	11 days	11 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW-5C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5D FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
SAMPLING DATE			11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/18/86	11/18/86	11/18/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	11/24/86	11/24/86	11/24/86
Elapsed Time			14 days	14 days	14 days	14 days	14 days	14 days	6 days	6 days	6 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	11/24/86	11/24/86	11/24/86
Elapsed Time			14 days	14 days	14 days	14 days	14 days	14 days	6 days	6 days	6 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted			11/26/86	11/26/86	11/26/86	11/26/86	11/26/86	11/26/86			
Elapsed Time			4 days	4 days	4 days	4 days	4 days	4 days			
Date Analyzed			12/01/86	12/01/86	12/01/86	12/01/86	12/01/86	12/01/86			
Elapsed Time			5 days	5 days	5 days	5 days	5 days	5 days			
Herbicides	EPA 3550/8150										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Moisture	EPA 160.3										
Date Analyzed			12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/03/86	12/03/86	12/03/86
Elapsed Time			10 days	10 days	10 days	10 days	10 days	10 days	15 days	15 days	15 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
SAMPLING DATE			11/18/86	11/24/86	11/24/86	11/24/86	11/24/86	11/23/86	11/23/86	11/24/86	11/24/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			11/24/86	12/08/86	12/08/86	12/08/86	12/08/86	12/01/86	12/01/86	12/08/86	12/08/86
Elapsed Time			6 days	14 days	14 days	14 days	14 days	8 days	8 days	14 days	14 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			11/24/86	12/08/86	12/08/86	12/08/86	12/08/86	12/01/86	12/01/86	12/08/86	12/08/86
Elapsed Time			6 days	14 days	14 days	14 days	14 days	8 days	8 days	14 days	14 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted				12/01/86	12/01/86	12/01/86	12/01/86	11/30/86	11/30/86	12/01/86	12/01/86
Elapsed Time				7 days	7 days	7 days	7 days	7 days	7 days	7 days	7 days
Date Analyzed				12/05/86	12/05/86	12/05/86	12/05/86	12/05/86	12/05/86	12/05/86	12/05/86
Elapsed Time				4 days	4 days	4 days	4 days	5 days	5 days	4 days	4 days
Herbicides	EPA 3550/8150										
Date Extracted				12/01/86	12/01/86	12/01/86	12/01/86	11/28/86	11/28/86	12/01/86	12/01/86
Elapsed Time				7 days	7 days	7 days	7 days	5 days	5 days	7 days	7 days
Date Analyzed				12/27/86	12/27/86	12/27/86	12/27/86	12/23/86	12/23/86	12/27/86	12/27/86
Elapsed Time				26 days	26 days	26 days	26 days	25 days	25 days	26 days	26 days
Moisture	EPA 160.3										
Date Analyzed			12/03/86	12/22/86	12/22/86	12/22/86	12/22/86	12/02/86	12/02/86	12/22/86	12/22/86
Elapsed Time			15 days	28 days	28 days	28 days	28 days	9 days	9 days	28 days	28 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
SAMPLING DATE			12/05/86	12/05/86	12/05/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/07/86
Purgeable Halocarbons	EPA 8010										
Date Analyzed			12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/14/86
Elapsed Time			7 days	7 days	7 days	6 days	6 days	6 days	6 days	6 days	7 days
Purgeable Aromatics	EPA 8020										
Date Analyzed			12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/12/86	12/14/86
Elapsed Time			7 days	7 days	7 days	6 days	6 days	6 days	6 days	6 days	7 days
Pesticides/PCBs	EPA 3550/8080										
Date Extracted			12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/14/86
Elapsed Time			4 days	4 days	4 days	3 days	3 days	3 days	3 days	3 days	7 days
Date Analyzed			12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	12/14/86	01/08/87
Elapsed Time			5 days	5 days	5 days	5 days	5 days	5 days	5 days	5 days	25 days
Herbicides	EPA 3550/8150										
Date Extracted			12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	
Elapsed Time			6 days	6 days	6 days	5 days	5 days	5 days	5 days	5 days	
Date Analyzed			12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	
Elapsed Time			13 days	13 days	13 days	13 days	13 days	13 days	13 days	13 days	
Moisture	EPA 160.3										
Date Analyzed			12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86	12/22/86
Elapsed Time			17 days	17 days	17 days	16 days	16 days	16 days	16 days	16 days	15 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	SS-8A* EIGHT	SS-8B* EIGHT
SAMPLING DATE			11/25/86*	11/25/86*
Purgeable Halocarbons	EPA 8010			
Date Analyzed			12/08/86	12/08/86
Elapsed Time			13 days*	13 days*
Purgeable Aromatics	EPA 8020			
Date Analyzed			12/08/86	12/08/86
Elapsed Time			13 days*	13 days*
Pesticides/PCBs	EPA 3550/8080			
Date Extracted			12/02/86	12/02/86
Elapsed Time			7 days*	7 days*
Date Analyzed			12/05/86	12/05/86
Elapsed Time			4 days*	4 days*
Herbicides	EPA 3550/8150			
Date Extracted			12/02/86	12/02/86
Elapsed Time			7 days*	7 days*
Date Analyzed			12/27/86	12/27/86
Elapsed Time			26 days*	26 days*
Moisture	EPA 160.3			
Date Analyzed			12/22/86	12/22/86
Elapsed Time			27 days*	27 days*

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
SAMPLING DATE			11/19/86	11/19/86	11/19/86	11/18/86	11/19/86	11/20/86	11/23/86	11/23/86	11/12/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/11/86	12/11/86	12/11/86	12/11/86	12/11/86	12/09/86	12/09/86	12/09/86	11/26/86
Elapsed Time			22 days	22 days	22 days	23 days	22 days	19 days	16 days	16 days	14 days
Phenol	EPA 420.2										
Date Analyzed			12/03/86	12/03/86	12/03/86	12/03/86	12/03/86	12/03/86	12/03/86	12/03/86	11/26/86
Elapsed Time			14 days	14 days	14 days	15 days	14 days	13 days	10 days	10 days	14 days
Arsenic	EPA 3050/7060										
Date Analyzed			12/03/86	12/03/86	12/03/86	12/03/86	12/03/86	12/09/86	12/04/86	12/04/86	
Elapsed Time			14 days	14 days	14 days	15 days	14 days	19 days	11 days	11 days	
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed			01/05/87	01/05/87	01/05/87	01/05/87	01/05/87	01/12/87	01/05/87	01/05/87	
Elapsed Time			47 days	47 days	47 days	48 days	47 days	53 days	43 days	43 days	
Mercury	EPA 7471										
Date Analyzed			11/26/86	11/26/86	11/26/86	11/26/86	11/26/86	12/08/86	12/04/86	12/04/86	
Elapsed Time			7 days	7 days	7 days	8 days	7 days	18 days	11 days	11 days	
Selenium	EPA 3050/7740										
Date Analyzed			12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/09/86	12/04/86	12/04/86	
Elapsed Time			15 days	15 days	15 days	16 days	15 days	19 days	11 days	11 days	

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
SAMPLING DATE			11/12/86	11/12/86	11/17/86	11/17/86	11/17/86	11/13/86	11/14/86	11/14/86	11/17/86
Oil & Grease	EPA 413.2										
Date Analyzed			11/26/86	11/26/86	12/08/86	12/08/86	12/08/86	11/26/86	11/26/86	11/26/86	12/08/86
Elapsed Time			14 days	14 days	21 days	21 days	21 days	13 days	12 days	12 days	21 days
Phenolics	EPA 420.2										
Date Analyzed			11/26/86	11/26/86	12/03/86	12/03/86	12/03/86	11/26/86	11/26/86	11/26/86	12/03/86
Elapsed Time			14 days	14 days	16 days	16 days	16 days	13 days	12 days	12 days	16 days
Arsenic	EPA 3050/7060										
Date Analyzed											
Elapsed Time											
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed											
Elapsed Time											
Mercury	EPA 7471										
Date Analyzed											
Elapsed Time											
Selenium	EPA 3050/7740										
Date Analyzed											
Elapsed Time											

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
SAMPLING DATE			11/17/86	11/22/86	11/22/86	11/22/86	11/25/86	11/25/86	11/25/86	11/25/86	11/25/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/08/86	12/09/86	12/09/86	12/09/86	12/26/86	12/26/86	12/26/86	12/26/86	12/26/86
Elapsed Time			21 days	17 days	17 days	17 days	31 days	31 days	31 days	31 days	31 days
Phenolics	EPA 420.2										
Date Analyzed			12/03/86	12/03/86	12/03/86	12/03/86	12/08/86	12/08/86	12/08/86	12/08/86	12/08/86
Elapsed Time			16 days	11 days	11 days	11 days	13 days	13 days	13 days	13 days	13 days
Arsenic	EPA 3050/7060										
Date Analyzed							12/11/86	12/11/86	12/11/86	12/11/86	12/11/86
Elapsed Time							16 days	16 days	16 days	16 days	16 days
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed							12/09/86	12/09/86	12/09/86	12/09/86	12/09/86
Elapsed Time							14 days	14 days	14 days	14 days	14 days
Mercury	EPA 7471										
Date Analyzed							12/13/86	12/13/86	12/13/86	12/13/86	12/13/86
Elapsed Time							18 days	18 days	18 days	18 days	18 days
Selenium	EPA 3050/7740										
Date Analyzed							12/11/86	12/11/86	12/11/86	12/11/86	12/11/86
Elapsed Time							16 days	16 days	16 days	16 days	16 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #:	B3-B	B3-C	B3-C	B3-C	B3-C	GW3-A	GW3-B	GW3-D	
			5-6.5	0-1.5	2.5-4	5-6.5	5-6.5	5-6.5	5-6.5	5-6.5	SS-3A
		Site :	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE	THREE
SAMPLING DATE			11/25/86	11/25/86	11/25/86	11/25/86	12/01/86	11/26/86*	12/02/86*	12/02/86*	11/22/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/26/86	12/26/86	12/26/86	12/26/86	12/30/86	12/26/86	12/30/86	12/30/86	12/09/86
Elapsed Time			31 days	31 days	31 days	31 days	29 days	30 days*	28 days*	28 days*	17 days
Phenolics	EPA 420.2										
Date Analyzed			12/08/86	12/08/86	12/08/86	12/08/86	12/11/86	12/08/86	12/11/86	12/11/86	12/03/86
Elapsed Time			13 days	13 days	13 days	13 days	10 days	12 days*	9 days*	9 days*	11 days
Arsenic	EPA 3050/7060										
Date Analyzed			12/11/86	12/11/86	12/11/86	12/11/86	12/13/86	12/11/86	12/13/86	12/13/86	12/04/86
Elapsed Time			16 days	16 days	16 days	16 days	12 days	15 days*	11 days*	11 days*	12 days
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed			12/09/86	12/09/86	12/09/86	12/09/86	01/07/87	12/09/86	01/07/87	01/07/87	01/05/87
Elapsed Time			14 days	14 days	14 days	14 days	37 days	13 days*	36 days*	36 days*	44 days
Mercury	EPA 7471										
Date Analyzed			12/13/86	12/13/86	12/13/86	12/13/86	12/13/86	12/13/86	12/13/86	12/13/86	12/04/86
Elapsed Time			18 days	18 days	18 days	18 days	12 days	17 days*	11 days*	11 days*	12 days
Selenium	EPA 3050/7740										
Date Analyzed			12/11/86	12/11/86	12/11/86	12/11/86	12/14/86	12/11/86	12/14/86	12/14/86	12/04/86
Elapsed Time			16 days	16 days	16 days	16 days	13 days	15 days*	12 days*	12 days*	12 days

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	SS-3B THREE	SS-3C THREE	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR
SAMPLING DATE			11/22/86	11/22/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86	12/02/86
Oil & Grease	EPA 413.2									
Date Analyzed			12/09/86	12/09/86	12/30/86	12/30/86	12/30/86	12/30/86	12/30/86	12/30/86
Elapsed Time			17 days	17 days	28 days	28 days	28 days	28 days	28 days	28 days
Phenolics	EPA 420.2									
Date Analyzed			12/03/86	12/03/86						
Elapsed Time			11 days	11 days						
Arsenic	EPA 3050/7060									
Date Analyzed			12/04/86	12/04/86						
Elapsed Time			12 days	12 days						
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7									
Date Analyzed			01/05/87	01/05/87						
Elapsed Time			44 days	44 days						
Mercury	EPA 7471									
Date Analyzed			12/04/86	12/04/86						
Elapsed Time			12 days	12 days						
Selenium	EPA 3050/7740									
Date Analyzed			12/04/86	12/04/86						
Elapsed Time			12 days	12 days						

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR
SAMPLING DATE			12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/05/86	12/05/86	12/02/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/31/86	12/31/86	12/31/86	12/31/86	12/31/86	12/31/86	12/31/86	12/31/86	12/30/86
Elapsed Time			27 days	27 days	27 days	27 days	27 days	27 days	26 days	26 days	28 days
Phenolics	EPA 420.2										
Date Analyzed											
Elapsed Time											
Arsenic	EPA 3050/7060										
Date Analyzed											
Elapsed Time											
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed											
Elapsed Time											
Mercury	EPA 7471										
Date Analyzed											
Elapsed Time											
Selenium	EPA 3050/7740										
Date Analyzed											
Elapsed Time											

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
SAMPLING DATE			12/03/86	12/03/86	12/03/86	11/23/86	11/23/86	11/23/86	11/23/86	11/21/86	11/21/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/30/86	12/30/86	12/30/86	12/09/86	12/09/86	12/09/86	12/09/86	12/18/86	12/18/86
Elapsed Time			27 days	27 days	27 days	16 days	16 days	16 days	16 days	27 days	27 days
Phenolics	EPA 420.2										
Date Analyzed										12/04/86	12/04/86
Elapsed Time										13 days	13 days
Arsenic	EPA 3050/7060										
Date Analyzed										12/09/86	12/09/86
Elapsed Time										18 days	18 days
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed										01/12/87	01/12/87
Elapsed Time										52 days	52 days
Mercury	EPA 7471										
Date Analyzed										12/04/86	12/04/86
Elapsed Time										13 days	13 days
Selenium	EPA 3050/7740										
Date Analyzed										12/09/86	12/09/86
Elapsed Time										18 days	18 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
SAMPLING DATE			11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/22/86	11/18/86	11/18/86*	11/18/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/18/86	12/18/86	12/18/86	12/18/86	12/18/86	12/18/86	12/05/86	12/05/86	12/05/86
Elapsed Time			26 days	26 days	26 days	26 days	26 days	26 days	17 days	17 days	17 days
Phenolics	EPA 420.2										
Date Analyzed			12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86			
Elapsed Time			12 days	12 days	12 days	12 days	12 days	12 days			
Arsenic	EPA 3050/7060										
Date Analyzed			12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86			
Elapsed Time			17 days	17 days	17 days	17 days	17 days	17 days			
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed			01/12/87	01/12/87	01/12/87	01/12/87	01/12/87	01/12/87			
Elapsed Time			51 days	51 days	51 days	51 days	51 days	51 days			
Mercury	EPA 7471										
Date Analyzed			12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86			
Elapsed Time			12 days	12 days	12 days	12 days	12 days	12 days			
Selenium	EPA 3050/7740										
Date Analyzed			12/09/86	12/09/86	12/09/86	12/09/86	12/09/86	12/09/86			
Elapsed Time			17 days	17 days	17 days	17 days	17 days	17 days			

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
SAMPLING DATE			11/18/86	11/24/86	11/24/86	11/24/86	11/24/86	11/23/86	11/23/86	11/24/86	11/24/86
Oil & Grease	EPA 413.2										
Date Analyzed			12/05/86	12/18/86	12/18/86	12/18/86	12/18/86	12/18/86	12/18/86	12/18/86	12/19/86
Elapsed Time			17 days	24 days	24 days	24 days	24 days	25 days	25 days	24 days	25 days
Phenolics	EPA 420.2										
Date Analyzed				12/10/86	12/10/86	12/10/86	12/10/86	12/03/86	12/03/86	12/10/86	12/10/86
Elapsed Time				16 days	16 days	16 days	16 days	10 days	10 days	16 days	16 days
Arsenic	EPA 3050/7060										
Date Analyzed				12/13/86	12/13/86	12/13/86	12/13/86	12/09/86	12/09/86	12/13/86	12/13/86
Elapsed Time				20 days	20 days	20 days	19 days	16 days	16 days	19 days	19 days
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed				12/04/86	12/04/86	12/04/86	12/04/86	01/12/87	01/12/87	12/04/86	01/07/87
Elapsed Time				10 days	10 days	10 days	10 days	19 days	19 days	10 days	44 days
Mercury	EPA 7471										
Date Analyzed				12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/04/86	12/13/86
Elapsed Time				10 days	10 days	10 days	10 days	11 days	11 days	10 days	20 days
Selenium	EPA 3050/7740										
Date Analyzed				12/14/86	12/14/86	12/14/86	12/14/86	12/09/86	12/09/86	12/14/86	12/14/86
Elapsed Time				20 days	20 days	20 days	20 days	16 days	16 days	20 days	20 days

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-8B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
SAMPLING DATE			12/05/86	12/05/86	12/05/86	12/06/86	12/06/86	12/06/86	12/06/86	12/06/86	12/07/86
Oil & Grease	EPA 413.2										
Date Analyzed			01/02/87	01/02/87	01/02/87	01/02/87	01/02/87	01/02/87	01/02/87	01/02/87	01/02/87
Elapsed Time			28 days	28 days	28 days	27 days	27 days	27 days	27 days	27 days	26 days
Phenolics	EPA 420.2										
Date Analyzed			12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/31/86
Elapsed Time			19 days	19 days	19 days	18 days	18 days	18 days	18 days	18 days	24 days
Arsenic	EPA 3050/7060										
Date Analyzed			12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86	12/23/86
Elapsed Time			18 days	18 days	18 days	17 days	17 days	17 days	17 days	17 days	16 days
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7										
Date Analyzed			01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/07/87	01/05/87
Elapsed Time			33 days	33 days	33 days	32 days	32 days	32 days	32 days	32 days	29 days
Mercury	EPA 7471										
Date Analyzed			12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/24/86	12/22/86
Elapsed Time			19 days	19 days	19 days	19 days	18 days	18 days	18 days	18 days	15 days
Selenium	EPA 3050/7740										
Date Analyzed			12/29/86	12/29/86	12/29/86	12/29/86	12/29/86	12/29/86	12/29/86	12/29/86	12/29/86
Elapsed Time			24 days	24 days	24 days	23 days	23 days	23 days	23 days	23 days	22 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	SS-8A* / EIGHT	SS-8B* / EIGHT
SAMPLING DATE			11/25/86*	11/25/86*
Oil & Grease	EPA 413.2			
Date Analyzed			12/19/86	12/19/86
Elapsed Time			24 days*	24 days*
Phenolics	EPA 420.2			
Date Analyzed			12/10/86	12/10/86
Elapsed Time			15 days*	15 days*
Arsenic	EPA 3050/7060			
Date Analyzed			12/13/86	12/13/86
Elapsed Time			18 days*	18 days*
Ba, Cd, Cr, Pb, Ag	EPA 3050/6010/200.7			
Date Analyzed			01/07/87	01/07/87
Elapsed Time			43 days*	43 days*
Mercury	EPA 7471			
Date Analyzed			12/13/86	12/13/86
Elapsed Time			18 days*	18 days*
Selenium	EPA 3050/7740			
Date Analyzed			12/14/86	12/14/86
Elapsed Time			19 days*	19 days*

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	DRUM 421 TWO	DRUM 422 THREE	0-2.5 462 FOUR	0-2.5 459 EIGHT	GW-8C DRUM EIGHT	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX	B6-B 2.5-4 SIX
SAMPLING DATE			12/01/86	12/01/86	12/05/86	12/05/86	12/07/86	11/18/86	11/18/86	11/18/86	11/18/86
Ethylene Glycol	P&CAM 338										
Date Analyzed								11/26/86	11/26/86	11/26/86	11/26/86
Elapsed Time								6 days	6 days	6 days	6 days
Ignitability	EPA 1010										
Date Analyzed			12/12/86	12/12/86	12/12/86	12/12/86	12/26/86				
Elapsed Time			11 days	11 days	7 days	7 days	19 days				
EP Tox Extraction	EPA 1310										
Date Extracted			12/10/86	12/10/86	12/13/86	12/13/86	12/17/86				
Elapsed Time			9 days	9 days	8 days	8 days	10 days				
Arsenic	EPA 7060										
Date Analyzed			12/16/86	12/16/86	12/16/86	12/16/86	12/23/86				
Elapsed Time			6 days	6 days	3 days	3 days	6 days				
Barium	EPA 7080										
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/30/86				
Elapsed Time			7 days	7 days	4 days	4 days	13 days				
Cadmium	EPA 7130										
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/30/86				
Elapsed Time			7 days	7 days	4 days	4 days	13 days				

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Holding Time Summary

Parameter	Method						
		Field #:	DRUM 421	DRUM 422	0-2.5 462	0-2.5 459	GW-8C DRUM
		Site :	TWO	THREE	FOUR	EIGHT	EIGHT
SAMPLING DATE			12/01/86	12/01/86	12/05/86	12/05/86	12/07/86
Chromium	EPA 7190						
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/27/86
Elapsed Time			7 days	7 days	4 days	4 days	10 days
Lead	EPA 7421						
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/22/86
Elapsed Time			7 days	7 days	4 days	4 days	5 days
Mercury	EPA 7470						
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/24/86
Elapsed Time			7 days	7 days	4 days	4 days	7 days
Selenium	EPA 7740						
Date Analyzed			12/16/86	12/16/86	12/16/86	12/16/86	12/29/86
Elapsed Time			6 days	6 days	3 days	3 days	22 days
Silver	EPA 7760						
Date Analyzed			12/17/86	12/17/86	12/17/86	12/17/86	12/30/86
Elapsed Time			7 days	7 days	4 days	4 days	13 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
SAMPLING DATE			12/10/86	12/11/86	12/15/86	12/15/86	11/23/86	11/23/86	01/01/87	01/02/87	01/02/87
Purgeable Halocarbons	EPA 601										
Date Analyzed			12/17/86	12/17/86	12/23/86	12/23/86	12/06/86	12/06/86	01/12/87	01/12/87	01/12/87
Elapsed Time			7 days	6 days	8 days	8 days	13 days	13 days	11 days	10 days	10 days
Purgeable Aromatics	EPA 602										
Date Analyzed			12/17/86	12/17/86	12/23/86	12/23/86	12/06/86	12/06/86	01/12/87	01/12/87	01/12/87
Elapsed Time			7 days	7 days	8 days	8 days	13 days	13 days	11 days	10 days	10 days
Pesticides/PCBs	EPA 608										
Date Extracted			12/17/86	12/17/86	12/20/86	12/20/86	11/29/86	11/29/86			
Elapsed Time			7 days	6 days	5 days	5 days	6 days	6 days			
Date Analyzed			01/08/87	01/08/87	01/08/87	01/08/87	12/02/86	12/02/86			
Elapsed Time			22 days	22 days	19 days	19 days	3 days	3 days			
Herbicides	EPA 615										
Date Extracted			12/17/86	12/17/86	12/20/86	12/20/86	11/29/86	11/29/86			
Elapsed Time			7 days	6 days	5 days	5 days	6 days	6 days			
Date Analyzed			01/13/87	01/13/87	01/13/87	01/13/87	12/17/86	12/16/86			
Elapsed Time			4 days	4 days	24 days	24 days	18 days	17 days			
Oil and Grease	EPA 413.2										
Date Analyzed			01/06/87	01/06/87	01/13/87	01/13/87	12/10/86	12/10/86	01/22/87	01/22/87	01/22/87
Elapsed Time			27 days	26 days	29 days	29 days	17 days	17 days	21 days	20 days	20 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
SAMPLING DATE			01/02/87	01/03/87*	11/22/86	11/22/86	11/22/86	01/03/87	01/03/87	01/04/87	01/04/87
Purgeable Halocarbons	EPA 601										
Date Analyzed			01/12/87	01/12/87	12/04/86	12/04/86	12/04/86	01/12/87	01/12/87	01/13/87	01/13/87
Elapsed Time			10 days	9 days*	12 days	12 days	12 days	9 days	9 days	9 days	9 days
Purgeable Aromatics	EPA 602										
Date Analyzed			01/12/87	01/12/87	12/04/86	12/04/86	12/04/86	01/12/87	01/12/87	01/13/87	01/13/87
Elapsed Time			10 days	9 days*	12 days	12 days	12 days	9 days	9 days	8 days	8 days
Pesticides/PCBs	EPA 608										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Herbicides	EPA 615										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Oil and Grease	EPA 413.2										
Date Analyzed			01/22/87	01/22/87	12/10/86	12/10/86	12/10/86	01/22/87	01/22/87	01/22/87	01/22/87
Elapsed Time			20 days	19 days*	18 days	18 days	18 days	19 days	19 days	18 days	18 days

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
SAMPLING DATE			01/04/87	01/07/87	01/06/87	01/06/87	01/06/87	01/07/87	11/22/86	11/22/86	11/22/86
Purgeable Halocarbons	EPA 601										
Date Analyzed			01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	11/28/86	11/28/86	11/28/86
Elapsed Time			9 days	6 days	7 days	7 days	7 days	6 days	6 days	6 days	6 days
Purgeable Aromatics	EPA 602										
Date Analyzed			01/13/87	01/13/87	01/13/87	01/13/87	01/13/87	01/14/87	11/28/86	11/28/86	11/28/86
Elapsed Time			9 days	6 days	7 days	7 days	7 days	7 days	6 days	6 days	6 days
Pesticides/PCBs	EPA 608										
Date Extracted					01/13/87	01/13/87	01/13/87	01/12/87	11/29/86	11/29/86	11/29/86
Elapsed Time					7 days	7 days	7 days	5 days	7 days	7 days	7 days
Date Analyzed					01/16/86	01/16/86	01/16/86	01/16/86	12/02/86	12/02/86	12/02/86
Elapsed Time					3 days	3 days	3 days	4 days	3 days	3 days	3 days
Herbicides	EPA 615										
Date Extracted					01/12/87	01/12/87	01/12/87	01/12/87	11/29/86	11/29/86	11/29/86
Elapsed Time					6 days	6 days	6 days	5 days	7 days	7 days	7 days
Date Analyzed					01/19/87	01/19/87	01/19/87	01/19/87	12/17/86	12/17/86	12/17/86
Elapsed Time					7 days	7 days	7 days	7 days	18 days	18 days	18 days
Oil and Grease	EPA 413.2										
Date Analyzed			01/22/87	01/26/87	01/22/87	01/22/87	01/22/87	01/26/87	12/10/86	12/10/86	12/10/86
Elapsed Time			18 days	21 days	16 days	16 days	16 days	19 days	12 days	12 days	12 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MB-8 FOUR
SAMPLING DATE			12/18/86	12/19/86	12/19/86	12/19/86	11/23/86	11/23/86	11/23/86	11/23/86	12/20/86
Purgeable Halocarbons	EPA 601										
Date Analyzed			12/23/86	12/29/86	12/29/86	12/29/86	12/03/86	12/03/86	12/03/86	12/03/86	12/29/86
Elapsed Time			5 days	10 days	10 days	10 days	10 days	10 days	10 days	10 days	9 days
Purgeable Aromatics	EPA 602										
Date Analyzed			12/23/86	12/30/86	12/30/86	12/30/86	12/03/86	12/03/86	12/03/86	12/03/86	12/30/86
Elapsed Time			5 days	11 days	11 days	11 days	10 days	10 days	10 days	10 days	10 days
Pesticides/PCBs	EPA 608										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Herbicides	EPA 615										
Date Extracted											
Elapsed Time											
Date Analyzed											
Elapsed Time											
Oil and Grease	EPA 413.2										
Date Analyzed			01/13/87	01/16/87	01/16/87	01/16/87		12/18/86	12/18/86	12/18/86	01/16/87
Elapsed Time			26 days	28 days	28 days	28 days		25 days	25 days	25 days	27 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
SAMPLING DATE			12/20/86	12/20/86	12/20/86	12/17/86	12/16/86*	12/16/86*	11/22/86	11/22/86	11/22/86
Purgeable Halocarbons	EPA 601										
Date Analyzed			12/29/86	12/29/86	12/29/86	12/23/86	12/23/86	12/23/86	12/06/86	12/06/86	12/06/86
Elapsed Time			9 days	9 days	9 days	6 days	7 days*	7 days*	14 days	14 days	14 days
Purgeable Aromatics	EPA 602										
Date Analyzed			12/30/86	12/30/86	12/30/86	12/23/86	12/23/86	12/23/86	12/06/86	12/06/86	12/06/86
Elapsed Time			10 days	10 days	10 days	6 days	7 days*	7 days*	14 days	14 days	14 days
Pesticides/PCBs	EPA 608										
Date Extracted						12/24/86	12/24/86	12/24/86	11/29/86	11/29/86	11/29/86
Elapsed Time						7 days	8 days*	8 days*	7 days	7 days	7 days
Date Analyzed						01/08/87	01/08/87	01/08/87	12/02/86	12/02/86	12/02/86
Elapsed Time						13 days	14 days*	14 days*	3 days	3 days	3 days
Herbicides	EPA 615										
Date Extracted						12/22/86	12/22/86	12/22/86	11/29/86	11/29/86	11/29/86
Elapsed Time						5 days	6 days*	6 days*	7 days	7 days	7 days
Date Analyzed						01/13/87	01/13/87	01/13/87	12/17/86	12/17/86	12/17/86
Elapsed Time						22 days	23 days*	23 days*	18 days	18 days	18 days
Oil and Grease	EPA 413.2										
Date Analyzed			01/16/87	01/16/87	01/16/87	01/12/87	01/12/87	01/12/87	12/10/86	12/10/86	12/10/86
Elapsed Time			27 days	27 days	27 days	26 days	27 days*	27 days*	18 days	18 days	18 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
SAMPLING DATE			12/17/86	12/18/86	12/19/86*	11/24/86	01/09/87	01/07/87	01/09/87	11/25/86	11/25/86
Purgeable Halocarbons	EPA 601										
Date Analyzed			12/23/86	12/23/86	12/29/86	12/06/86	01/20/87	01/14/87	01/20/87	12/06/86	12/06/86
Elapsed Time			6 days	5 days	10 days*	12 days	11 days	7 days	11 days	11 days	11 days
Purgeable Aromatics	EPA 602										
Date Analyzed			12/23/86	12/23/86	12/29/86	12/06/86	01/20/87	01/14/87	01/20/87	12/06/86	12/06/86
Elapsed Time			6 days	5 days	10 days*	12 days	11 days	7 days	11 days	11 days	11 days
Pesticides/PCBs	EPA 608										
Date Extracted			12/24/86	12/23/86	12/26/86	12/01/86	01/13/87	01/12/87	01/13/87	12/02/86	12/02/86
Elapsed Time			5 days	5 days	7 days*	7 days	4 days	5 days	4 days	7 days	7 days
Date Analyzed			01/08/87	01/08/87	01/08/87	12/14/86	01/16/87	01/16/87	01/16/87	12/14/86	12/14/86
Elapsed Time			15 days	16 days	13 days*	13 days	3 days	4 days	3 days	12 days	12 days
Herbicides	EPA 615										
Date Extracted			12/22/86	12/22/86	12/26/86		01/13/87	01/12/87	01/13/87	12/02/86	12/02/86
Elapsed Time			5 days	4 days	7 days*		4 days	5 days	4 days	7 days	7 days
Date Analyzed			01/13/87	01/13/87	01/14/87		01/19/87	01/19/87	01/19/87	12/16/86	12/16/86
Elapsed Time			22 days	22 days	20 days*		6 days	7 days	7 days	14 days	14 days
Oil and Grease	EPA 413.2										
Date Analyzed			01/13/87	01/13/87	01/09/87	12/23/86	01/26/87	01/26/87	01/26/87	12/23/86	12/23/86
Elapsed Time			27 days	26 days	21 days*	29 days	17 days	19 days	17 days	28 days	28 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	TRIP BLANK ONE	TRIP BLANK THREE	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	GW3-A RINSE BLANK THREE	RINSE BLANK FIVE
SAMPLING DATE			12/15/86 (*)	01/07/87 (*)	12/23/86 (*)	12/19/86 (*)	01/12/87 (*)	01/07/87 (*)	12/17/86 (*)
Purgeable Halocarbons	EPA 601								
Date Analyzed					12/31/86	12/29/86	01/21/87	01/14/87	
Elapsed Time					8 days	10 days	9 days	7 days	
Purgeable Aromatics	EPA 602								
Date Analyzed						12/29/87	01/21/87		12/23/86
Elapsed Time						10 days	9 days		6 days
Pesticides/PCBs	EPA 608								
Date Extracted			12/17/86			12/24/86			
Elapsed Time			2 days			5 days			
Date Analyzed			01/08/87			01/08/87			
Elapsed Time			22 days			15 days			
Herbicides	EPA 615								
Date Extracted			12/17/87	01/12/87			01/13/87		
Elapsed Time			2 days	5 days			1 day		
Date Analyzed			01/13/87	01/19/87			01/19/87		
Elapsed Time			27 days	7 days			6 days		
Oil and Grease	EPA 413.2								
Date Analyzed					01/20/87				
Elapsed Time					28 days				

(*) Date sample received by DataChem.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site:	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
SAMPLING DATE			12/10/86	12/11/86	12/15/86	12/15/86	11/23/86	11/23/86	01/01/87	01/02/87	01/02/87
Phenolics	EPA 420.2										
Date Analyzed			12/24/86	12/24/86	01/07/87	01/07/87	12/04/86	12/04/86	01/14/87	01/14/87	01/14/87
Elapsed Time			14 days	13 days	23 days	23 days	11 days	11 days	13 days	12 days	12 days
Arsenic	EPA 206.2										
Date Analyzed			12/23/86	12/23/86	01/12/87	01/12/87	12/23/86	12/13/86			
Elapsed Time			13 days	12 days	28 days	28 days	20 days	20 days			
Barium	EPA 208.1										
Date Analyzed			12/30/86	12/30/86	01/15/87	01/15/87	12/03/86	12/03/86			
Elapsed Time			20 days	19 days	31 days	31 days	10 days	10 days			
Cadmium	EPA 213.1										
Date Analyzed			12/30/86	12/30/86	01/09/87	01/09/87	12/03/86	12/03/86			
Elapsed Time			20 days	19 days	25 days	25 days	10 days	10 days			
Chromium	EPA 218.1										
Date Analyzed			12/27/86	12/27/86	01/15/87	01/15/87	12/03/86	12/03/86			
Elapsed Time			17 days	16 days	31 days	31 days	10 days	10 days			
Lead	EPA 239.2										
Date Analyzed			12/22/86	12/22/86	01/10/87	01/10/87	12/16/86	12/16/86			
Elapsed Time			12 days	11 days	26 days	26 days	23 days	23 days			

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
SAMPLING DATE			01/02/87	01/03/87*	11/22/86	11/22/86	11/22/86	01/03/87	01/03/87	01/04/87	01/04/87
Phenolics	EPA 420.2										
Date Analyzed			01/14/87	01/14/87	12/04/86	12/04/86	12/04/86	01/14/87	01/14/87	01/14/87	01/14/87
Elapsed Time			12 days	11 days*	12 days	12 days	12 days	11 days	11 days	10 days	10 days
Arsenic	EPA 206.2										
Date Analyzed											
Elapsed Time											
Barium	EPA 208.1										
Date Analyzed											
Elapsed Time											
Cadmium	EPA 213.1										
Date Analyzed											
Elapsed Time											
Chromium	EPA 218.1										
Date Analyzed											
Elapsed Time											
Lead	EPA 239.2										
Date Analyzed											
Elapsed Time											

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
SAMPLING DATE			01/04/87	01/07/87	01/06/87	01/06/87	01/06/87	01/07/87	11/22/86	11/22/86	11/22/86
Phenolics	EPA 420.2										
Date Analyzed			01/14/87	01/20/87	01/16/87	01/16/87	01/16/87	01/22/87	12/04/86	12/04/86	12/04/86
Elapsed Time			10 days	13 days	10 days	10 days	10 days	15 days	12 days	12 days	12 days
Arsenic	EPA 206.2										
Date Analyzed					01/21/87	01/21/87	01/21/87	01/21/87	12/13/86	12/13/86	12/13/86
Elapsed Time					15 days	15 days	15 days	14 days	21 days	21 days	21 days
Barium	EPA 208.1										
Date Analyzed					01/20/87	01/20/87	01/20/87	01/20/87	12/03/86	12/03/86	12/03/86
Elapsed Time					14 days	14 days	14 days	13 days	11 days	11 days	11 days
Cadmium	EPA 213.1										
Date Analyzed					01/20/87	01/20/87	01/20/87	01/20/87	12/03/86	12/03/86	12/03/86
Elapsed Time					14 days	14 days	14 days	13 days	11 days	11 days	11 days
Chromium	EPA 218.1										
Date Analyzed					01/20/87	01/20/87	01/20/87	01/20/87	12/03/86	12/03/86	12/03/86
Elapsed Time					14 days	14 days	14 days	13 days	11 days	11 days	11 days
Lead	EPA 239.2										
Date Analyzed					01/21/87	01/21/87	01/21/87	01/21/87	12/16/86	12/16/86	12/16/86
Elapsed Time					15 days	15 days	15 days	14 days	24 days	24 days	24 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
SAMPLING DATE			12/18/86	12/19/86	12/19/86	12/19/86	11/23/86	11/23/86	11/23/86	11/23/86	12/20/86
Phenolics	EPA 420.2										
Date Analyzed											
Elapsed Time											
Arsenic	EPA 206.2										
Date Analyzed											
Elapsed Time											
Barium	EPA 208.1										
Date Analyzed											
Elapsed Time											
Cadmium	EPA 213.1										
Date Analyzed											
Elapsed Time											
Chromium	EPA 218.1										
Date Analyzed											
Elapsed Time											
Lead	EPA 239.2										
Date Analyzed											
Elapsed Time											

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
SAMPLING DATE			12/20/86	12/20/86	12/20/86	12/17/86	12/16/86*	12/16/86*	11/22/86	11/22/86	11/22/86
Phenolics	EPA 420.2										
Date Analyzed						01/07/87	01/07/87	01/07/87	12/04/86	12/04/86	12/04/86
Elapsed Time						21 days	22 days*	22 days*	12 days	12 days	12 days
Arsenic	EPA 206.2										
Date Analyzed						01/12/87	01/12/87	01/12/87	12/13/86	12/13/86	12/13/86
Elapsed Time						26 days	27 days*	27 days*	21 days	21 days	21 days
Barium	EPA 208.1										
Date Analyzed						01/15/87	01/15/87	01/15/87	12/03/86	12/03/86	12/03/86
Elapsed Time						29 days	30 days*	30 days*	11 days	11 days	11 days
Cadmium	EPA 213.1										
Date Analyzed						01/09/87	01/09/87	01/09/87	12/03/86	12/03/86	12/03/86
Elapsed Time						23 days	24 days*	24 days*	11 days	11 days	11 days
Chromium	EPA 218.1										
Date Analyzed						01/15/87	01/15/87	01/15/87	12/03/86	12/03/86	12/03/86
Elapsed Time						29 days	30 days*	30 days*	11 days	11 days	11 days
Lead	EPA 239.2										
Date Analyzed						01/10/87	01/10/87	01/10/87	12/16/86	12/16/86	12/16/86
Elapsed Time						24 days	25 days*	25 days*	24 days	24 days	24 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
SAMPLING DATE			12/17/86	12/18/86	12/19/86*	11/24/86	01/09/87	01/07/87	01/09/87	11/25/86*	11/25/86
Phenolics	EPA 420.2										
Date Analyzed			01/07/87	12/24/86	12/31/86	12/11/86	11/22/87	01/22/87	01/22/87	12/11/86	12/11/86
Elapsed Time			21 days	6 days	12 days*	17 days	13 days	13 days	13 days	16 days*	16 days
Arsenic	EPA 206.2										
Date Analyzed			01/12/87	01/12/87	01/07/87	12/23/86	01/21/87	01/21/87	01/21/87	12/23/86	12/23/86
Elapsed Time			26 days	25 days	19 days*	29 days	12 days	14 days	12 days	28 days*	28 days
Barium	EPA 208.1										
Date Analyzed			01/15/87	01/15/87	01/07/87	12/30/86	01/20/87	01/20/87	01/20/87	12/30/86	12/30/86
Elapsed Time			29 days	28 days	19 days*	36 days	11 days	13 days	11 days	35 days*	35 days
Cadmium	EPA 213.1										
Date Analyzed			01/09/87	01/09/87	01/07/87	12/30/86	01/20/86	01/20/87	01/20/87	12/30/86	12/30/86
Elapsed Time			23 days	22 days	19 days*	35 days	11 days	13 days	11 days	35 days*	35 days
Chromium	EPA 218.1										
Date Analyzed			01/15/87	01/15/87	01/07/87	12/27/86	01/20/87	01/20/87	01/20/87	12/27/86	12/27/86
Elapsed Time			29 days	28 days	19 days*	33 days	11 days	13 days	11 days	32 days*	32 days
Lead	EPA 239.2										
Date Analyzed			01/10/87	01/10/87	01/07/87	12/22/86	01/21/87	01/21/87	01/21/87	12/22/86	12/22/86
Elapsed Time			24 days	23 days	19 days*	28 days	12 days	14 days	12 days	27 days*	27 days

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

		Field #: TRIP BLANK THREE	TRIP BLANK SEVEN	TRIP BLANK EIGHT	BAILER RINSE SEVEN
SAMPLING DATE		01/07/87 (*)	12/19/86 (*)	01/12/87 (*)	12/22/86 (*)
Phenolics	EPA 420.2				
Date Analyzed			12/31/86	01/22/87	
Elapsed Time			12 days	10 days	
Arsenic	EPA 206.2				
Date Analyzed		01/21/87			01/07/87
Elapsed Time		14 days			16 days
Barium	EPA 208.1				
Date Analyzed		01/20/87			01/07/87
Elapsed Time		13 days			16 days
Cadmium	EPA 213.1				
Date Analyzed		01/20/87			01/06/87
Elapsed Time		13 days			15 days
Chromium	EPA 218.1				
Date Analyzed		01/20/87			01/07/87
Elapsed Time		13 days			16 days
Lead	EPA 239.2				
Date Analyzed		01/21/87			01/07/87
Elapsed Time		14 days			16 days

(*) Date sample received by DataChem.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
SAMPLING DATE			12/10/86	12/11/86	12/15/86	12/15/86	11/23/86	11/23/86	01/01/87	01/02/87	01/02/87
Mercury	EPA 245.1										
Date Analyzed			12/24/86	12/24/86	12/23/86	12/23/86	12/04/86	12/04/86			
Elapsed Time			14 days	13 days	8 days	8 days	11 days	11 days			
Selenium	EPA 270.2										
Date Analyzed			12/29/86	12/29/86	01/14/87	01/14/87	12/14/86	12/14/86			
Elapsed Time			19 days	18 days	30 days	30 days	21 days	21 days			
Silver	EPA 272.1										
Date Analyzed			12/30/86	12/30/86	01/09/87	01/09/87	12/03/86	12/03/86			
Elapsed Time			20 days	19 days	25 days	25 days	10 days	10 days			

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
SAMPLING DATE			01/04/87	0/07/87	01/06/87	01/06/87	01/06/87	01/07/87	11/22/86	11/22/86	11/22/86
Mercury	EPA 245.1										
Date Analyzed					01/09/87	01/09/87	01/09/87	01/16/87	12/04/86	12/04/86	12/04/86
Elapsed Time					3 days	3 days	3 days	9 days	12 days	12 days	12 days
Selenium	EPA 270.2										
Date Analyzed					01/21/87	01/21/87	01/21/87	01/21/87	12/14/86	12/14/86	12/14/86
Elapsed Time					15 days	15 days	15 days	15 days	22 days	22 days	22 days
Silver	EPA 272.1										
Date Analyzed					01/20/87	01/20/87	01/20/87	01/20/87	12/03/86	12/03/86	12/03/86
Elapsed Time					14 days	14 days	14 days	13 days	11 days	11 days	11 days

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
SAMPLING DATE						12/17/86	12/16/86*	12/16/86*	11/22/86*	11/22/86*	11/22/86*
Mercury	EPA 245.1										
Date Analyzed						12/24/86	12/24/86	12/24/86	12/04/86*	12/04/86*	12/04/86*
Elapsed Time						7 days	8 days*	8 days*	12 days*	12 days*	12 days*
Selenium	EPA 270.2										
Date Analyzed						01/14/86	01/14/86	01/14/86	12/14/86*	12/14/86*	12/14/86*
Elapsed Time						18 days	19 days*	19 days*	22 days*	22 days*	22 days*
Silver	EPA 272.1										
Date Analyzed						01/09/87	01/09/87	01/09/87	12/03/86*	12/03/86*	12/03/86*
Elapsed Time						23 days	24 days*	24 days*	11 days*	11 days*	11 days*

* Revised 07/10/87

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
SAMPLING DATE			12/17/86	12/18/86	12/19/86*	11/24/86	01/09/87	01/07/87	01/09/87	11/25/86**	11/25/86
Mercury	EPA 245.1										
Date Analyzed			12/23/86	12/23/86	01/06/87	12/04/86	01/16/87	01/16/87	01/16/87	12/04/86	12/04/86
Elapsed Time			14 days	13 days	18 days*	10 days	7 days	9 days	7 days	8 days**	9 days
Selenium	EPA 270.2										
Date Analyzed			01/14/87	01/14/87	01/07/87	12/29/86	01/21/87	01/21/87	01/21/87	12/29/86	12/29/86
Elapsed Time			28 days	27 days	19 days*	35 days	12 days	14 days	12 days	34 days*	34 days
Silver	EPA 272.1										
Date Analyzed			01/09/87	01/09/87	01/06/87	12/30/86	01/20/87	01/20/87	01/20/87	12/30/86	12/30/86
Elapsed Time			23 days	22 days	18 days*	36 days	11 days	13 days	11 days	35 days*	35 days

*** SW-8A sample for Mercury taken 11/26/86; holding time calculated from this sampling date**
*** Revised 07/10/87**

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	TRIP BLANK THREE	RINSE BLANK FIVE	TRIP BLANK SEVEN	TRIP BLANK THREE	BAILER RINSE SEVEN
SAMPLING DATE			01/08/87 (*)	12/19/86 (*)	12/29/86 (*)	01/07/87 (*)	12/22/86 (*)
Mercury	EPA 245.1						
Date Analyzed			01/16/87	12/23/86	12/24/86	01/09/87	01/06/87
Elapsed Time			8 days	4 days	5 days	2 days	15 days
Selenium	EPA 270.2						
Date Analyzed			01/21/87				01/07/87
Elapsed Time			13 days				16 days
Silver	EPA 272.1						
Date Analyzed			01/20/87				01/06/87
Elapsed Time			12 days				15 days

(*) Date sample received by DataChem.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Holding Time Summary

Parameter	Method	Field #: / Site :	GW10-A TEN	GW10-B TEN	GW10-C TEN
SAMPLING DATE			12/31/86	01/01/87	01/01/87
Radiology					
Gross Alpha	Std. Method 703				
Date Analyzed			01/13/87	01/13/87	01/13/87
Elapsed Time			13 days	12 days	12 days
Gross Beta	Std. Method 703				
Date Analyzed			01/13/87	01/13/87	01/13/87
Elapsed Time			13 days	12 days	12 days
Radium-226	Std. Method 706				
Date Analyzed			01/21/87	01/21/87	01/21/87
Elapsed Time			21 days	20 days	20 days
Radium-228	Std. Method 708				
Date Analyzed			01/21/87	01/21/87	01/21/87
Elapsed Time			21 days	20 days	20 days

DATACHEM QUALITY CONTROL REPORT
Dul 'h IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Purgeable Halocarbons	EPA 8010 (*)	ug/g	MDL (**)								
Chlorobenzene	EPA 8010	ug/g	0.0018	B2-B 2.5-4	ND	0.10	97%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	52%	B2-C 0-1.5	ND	ND	
				SS-3A	ND	0.10	75%	SS-3A	ND	ND	
				B3-B 0-1.5	ND	0.10	85%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	96%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	94%	B3-C 5-6.5	ND	ND	
Chloroform	EPA 8010	ug/g	0.0022	B2-B 2.5-4	ND	0.10	98%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	63%	B2-C 0-1.5	ND	ND	
				SS-3A	ND	0.10	110%	SS-3A	ND	ND	
				B3-B 0-1.5	ND	0.10	99%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	84%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	93%	B3-C 5-6.5	ND	ND	
1,1-Dichloroethene	EPA 8010	ug/g	0.0025	B2-B 2.5-4	ND	0.10	95%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	59%	B2-C 0-1.5	ND	ND	
				SS-3A	0.0075	0.10	108%	SS-3A	0.0075	0.0043	
				B3-B 0-1.5	ND	0.10	88%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	77%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	120%	B3-C 5-6.5	ND	ND	
trans-1,2-Dichloroethene	EPA 8010	ug/g	0.0021	B3-C 5-6.5	ND	0.10	94%	B3-C 5-6.5	ND	ND	ND
Tetrachloroethene	EPA 8010	ug/g	0.0019	B2-B 2.5-4	ND	0.10	95%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	51%	B2-C 0-1.5	ND	ND	
				SS-3A	ND	0.10	68%	SS-3A	ND	ND	
				B3-B 0-1.5	ND	0.10	103%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	84%	B4-A 2.5-4	ND	ND	

(*) Methods documented in previous Analytical Report Section.
(**) MDL values documented in previous Analytical Report Section.

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Purgeable Halocarbons (continued)											
1,1,1-Trichloroethane	EPA 8010	ug/g	0.0026	B2-B 2.5-4	ND	0.10	101%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	63%	B2-C 0-1.5	ND	ND	
				SS-3A	0.0042	0.10	93%	SS-3A	0.0042	0.0034	
				B3-B 0-1.5	ND	0.10	92%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	94%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	97%	B3-C 5-6.5	ND	ND	
Tetrachloroethene	EPA 8010	ug/g	0.0030	B2-B 2.5-4	ND	0.10	89%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	60%	B2-C 0-1.5	ND	ND	
				SS-3A	0.0099	0.10	91%	SS-3A	0.0099	0.0059	
				B3-B 0-1.5	ND	0.10	103%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	84%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	94%	B3-C 5-6.5	ND	ND	
Purgeble Aromatics	EPA 8020	ug/g	MDL								
Benzene	EPA 8020	ug/g	0.0013	B2-B 2.5-4	ND	0.10	104%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	ND	0.10	47%	B2-C 0-1.5	ND	ND	
				SS-3A	ND	0.10	91%	SS-3A	ND	ND	
				B3-B 0-1.5	ND	0.10	85%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	95%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	83%	B3-C 5-6.5	ND	ND	
Toluene	EPA 8020	ug/g	0.0032	B2-B 2.5-4	ND	0.10	96%	B2-B 2.5-4	ND	ND	ND
				B2-C 0-1.5	0.54	0.10	32%	B2-C 0-1.5	0.54	0.28	
				SS-3A	0.013	0.10	87%	SS-3A	0.013	0.013	
				B3-B 0-1.5	ND	0.10	92%	B3-B 0-1.5	ND	ND	
				B4-A 2.5-4	ND	0.10	69%	B4-A 2.5-4	ND	ND	
				B3-C 5-6.5	ND	0.10	93%	B3-C 5-6.5	ND	ND	

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Pesticides	EPA 3550/8080	ug/g	MDL								
Aldrin	EPA 3550/8080	ug/g	0.002	B1-A 0-1.5	ND	0.08	88%	B3-C 5-6.5	ND	ND	ND
				B8-A 5-6.5	ND	0.08	88%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.08	88%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.10	90%				
Lindane	EPA 3550/8080	ug/g	0.003	B1-A 0-1.5	ND	0.08	88%	B3-C 5-6.5	ND	ND	ND
				B8-A 5-6.5	ND	0.08	88%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.08	113%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.10	100%				
4,4'-DDT	EPA 3550/8080	ug/g	0.004	B1-A 0-1.5	0.002	0.20	84%	B3-C 5-6.5	0.06	0.01	ND
				B8-A 5-6.5	ND	0.20	95%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.20	100%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.25	104%				
Dieldrin	EPA 3550/8080	ug/g	0.003	B1-A 0-1.5	0.009	0.20	81%	B3-C 5-6.5	ND	ND	ND
				B8-A 5-6.5	ND	0.20	80%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.20	75%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.25	100%				
Endrin	EPA 3550/8080	ug/g	0.005	B1-A 0-1.5	ND	0.20	90%	B3-C 5-6.5	ND	ND	ND
				B8-A 5-6.5	ND	0.20	105%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.20	100%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.25	96%				
Heptachlor	EPA 3550/8080	ug/g	0.004	B1-A 0-1.5	ND	0.08	88%	B3-C 5-6.5	ND	ND	ND
				B8-A 5-6.5	ND	0.08	100%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	0.08	113%	GW8-C 11-11.5	ND	ND	
				GW8-C 11-11.5	ND	0.10	100%				

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Herbicides	EPA 3550/8150	ug/g	MDL								
2,4-D	EPA 3550/8150	ug/g	0.10	GW1-A 10-11.5	ND	1.0	61%	GW1-B 5-6.5	ND	ND	ND
				GW3-D 5-6.5	ND	1.0	73%	B3-C 5-6.5	ND	ND	
				B8-A 5-6.5	ND	1.0	80%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	1.0	65%	GW8-A 5-6.5	ND	ND	
				GW8-C 11-11.5	ND	1.0	58%	GW8-B 10-11.5	ND	ND	
								GW8-C 11-11.5	ND	ND	
2,4,5-T	EPA 3550/8150	ug/g	0.02	GW1-A 10-11.5	ND	1.0	54%	GW1-B 5-6.5	ND	ND	ND
				GW3-D 5-6.5	ND	1.0	76%	B3-C 5-6.5	ND	ND	
				B8-A 5-6.5	ND	1.0	80%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	1.0	78%	GW8-A 5-6.5	ND	ND	
				GW8-C 11-11.5	ND	1.0	80%	GW8-B 10-11.5	ND	ND	
								GW8-C 11-11.5	ND	ND	
Silvex	EPA 3550/8150	ug/g	0.02	GW1-A 10-11.5	ND	1.0	64%	GW1-B 5-6.5	ND	ND	ND
				GW3-D 5-6.5	ND	1.0	80%	B3-C 5-6.5	ND	ND	
				B8-A 5-6.5	ND	1.0	95%	B8-A 2.5-4	ND	ND	
				B8-B 0-1.5	ND	1.0	76%	GW8-A 5-6.5	ND	ND	
				GW8-C 11-11.5	ND	1.0	79%	GW8-B 10-11.5	ND	ND	
								GW8-C 11-11.5	ND	ND	
Moisture	EPA 160.3	%	1.					B3-C 5-6.5	13%	11%	ND
								GW3-D 5-6.5	37%	58%	
								B8-A 2.5-4	12%	13%	
								B4-B 5-6.5	36%	77%	
								B4-E 2.5-4	15%	13%	
								B4-E 5-6.5	11%	12%	
								GW4-C 10-12	21%	32%	

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DATACHEM QUALITY CONTROL REPORT

Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Oil and Grease	EPA 413.2	ug/g	5.	GW1-A 10-11.5	ND	120	94%	GW1-A 10-11.5	ND	ND	ND
				B3-C 2.5-4	ND	120	110%	B3-C 5-6.5	ND	ND	
				SS-3C	33.	110	93%	SS-3C	33.	27.	
				B4-A 2.5-4	450	610	107%	B4-A 2.5-4	450	470	
				B4-C 5-6.5	40	120	88%	B4-B 5-6.5	580	770	
				B4-E 2.5-4	ND	120	87%	B4-C 5-6.5	40.	40.	
				GW4-A 10-11.5	580	1200	114%	B4-D 5-6.5	430	680	
				SS-4C	2400	5900	103%	B4-E 2.5-4	ND	ND	
				SS-5E	86.	110	122%	GW4-A 10-11.5	580	1100	
				B7-A 0-1.5	24.	110	123%	GW4-C 10-12	72.	93.	
				B7-B 0-1.5	ND	110	108%	SS-4C	2400	2800	
				B8-A 2.5-4	ND	120	97%	SS-5E	86.	66.	
				GW8-B 10-11.5	ND	120	104%	B7-A 2.5-4	ND	ND	
								B7-B 2.5-4	ND	ND	
								GW7-A 10-11.5	63.	64.	
								B8-A 2.5-4	ND	ND	
								GW8-B 10-11.5	ND	ND	
Phenolics	EPA 420.2	ug/g	5.	B1-A 2.5-4	ND	60.	97%	GW3-B 5-6.5	ND	ND	ND
				SS-1A	ND	60.	106%	GW3-D 5-6.5	ND	ND	
				GW1-E 20-21.5	ND	60.	105%	B7-A 0-1.5	ND	ND	
				B2-B 0-1.5	ND	60.	94%	SS-7A*	ND	ND	
				B2-C 0-1.5	14.	60.	102%	GW7-C 15-16.5	ND	ND	
				SS-2A	ND	60.	106%	B8-B 2.5-4	ND	ND	
				B3-B 5-6.5	ND	60.	102%	B8-B 5-6.5	ND	ND	
				B3-C 5-6.5	ND	60.	98%	SS-8A*	ND	ND	
				GW3-D 5-6.5	ND	60.	107%	GW8-C 11-11.5	ND	ND	
				GW5-A 5-6.5	ND	60.	1084				
				B7-A 0-1.5	6.	60.	97%				
				SS-7A*	ND	60.	99%				
				GW7-B 10-11.5	ND	60.	105%				
				GW7-C 15-16.5	ND	60.	99%				
				B8-A 5-6.5	ND	60.	107%				
				B8-B 0-1.5	ND	60.	105%				
				SS-8A*	ND	60.	99%				

* Revised 07/10/87

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Arsenic	EPA 3050/7060	ug/g	1.	B1-A 0-1.5	11.	5.	116%	GW1-E 20-21.5	8.	8.	ND
				GW1-E 20-21.5	8.	5.	82%				
				SS-1B	18.	5.	120%				
				B3-A 0-1.5	ND	5.	97%				
				SS-3C	16.	5.	82%				
				GW5-B 9.5-11	ND	5.	85%				
				SS-7A*	ND	9.	76%				
				GW7-A 10-11.5	8.	5.	86%				
				B7-B 2.5-4	ND	9.	68%				
				SS-8B*	ND	9.	82%				
				GW3-D 5-6.5	ND	9.	78%				
				GW3-B 5-6.5	ND	9.	64%				
Barium	EPA 200.7	ug/g	20.	GW1-A 10-11.5	57.	100	96%	GW1-A 10-11.5	71.	57.	ND
				GW1-E 20-21.5	24.	52.	109%	GW1-E 20-21.5	24.	24.	
				SS-1B	40.	100	94%	SS-1B	35.	40.	
				GW3-B 5-6.5	50.	52.	95%	GW3-D 5-6.5	64.	66.	
				SS-3A	100	100	96%	SS-3A	99.	100	
				SS-5B	41.	52.	109%	GW5-B 9.5-11	26.	26.	
				SS-7A*	24.	52.	106%	SS-7A*	23.	24.	
				B8-A 5-6.5	73.	52.	93%	GW7-B 10-11.5	46.	46.	
				SS-8B*	24.	52.	100%	B8-A 2.5-4	53.	74.	
				GW8-C 11-11.5	57.	52.	98%	SS-8A*	47.	46.	
								GW8-C 11-11.5	57.	57.	

* Revised 07/10/87

"ND" indicates that the [illegible]

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Lead	EPA 200.7	ug/g	2.	GW1-A 10-11.5	ND	50.	98%	GW1-A 10-11.5	ND	ND	ND
				GW1-E 20-21.5	ND	25.	80%	GW1-E 20-21.5	ND	ND	
				SS-1B	ND	50.	84%	SS-1B	ND	ND	
				GW3-B 5-6.5	ND	25.	82%	GW3-D 5-6.5	ND	ND	
				SS-3A	78.	50.	114%	SS-3A	75.	78.	
				SS-5B	ND	50.	87%	GW5-B 9.5-11	ND	ND	
				SS-7A*	9.	25.	90%	SS-7A*	6.	7.	
				B8-A 5-6.5	ND	25.	90%	GW7-B 10-11.5	ND	ND	
				SS-8B	43.	25.	93%	B8-A 2.5-4	ND	ND	
				GW8-C 11-11.5	ND	25.	80%	SS-8A*	ND	ND	
								GW8-C 11-11.5	ND	ND	
Silver	EPA200.7	ug/g	1.	GW1-A 10-11.5	ND	100	86%	GW1-A 10-11.5	ND	ND	ND
				GW1-E 20-21.5	ND	50.	94%	GW1-E 20-21.5	ND	ND	
				SS-1B	ND	100	92%	SS-1B	ND	ND	
				GW3-B 5-6.5	ND	50.	90%	GW3-D 5-6.5	ND	ND	
				SS-3A	ND	100	94%	SS-3A	ND	ND	
				SS-5B	ND	50.	99%	GW5-B 9.5-11	ND	ND	
				SS-7A*	ND	50.	91%	SS-7A*	ND	ND	
				B8-A 5-6.5	ND	50.	86%	GW7-B 10-11.5	ND	ND	
				SS-8B*	ND	50.	92%	B8-A 2.5-4	ND	ND	
				GW8-C 11-11.5	ND	50.	94%	SS-8A*	ND	ND	
								GW8-C 11-11.5	ND	ND	
Cadmium	EPA 200.7	ug/g	1.	GW1-A 10-11.5	ND	5.	87%	GW1-A 10-11.5	ND	ND	ND
				GW1-E 20-21.5	ND	2.5	82%	GW1-E 20-21.5	ND	ND	
				SS-1B	ND	5.	99%	SS-1B	ND	ND	
				GW3-B 5-6.5	ND	2.5	88%	GW3-D 5-6.5	ND	ND	
				SS-3A	6.	5.	99%	SS-3A	8.	6.	
				SS-5B	ND	7.5	88%	GW5-B 9.5-11	ND	ND	
				SS-7A*	ND	2.5	94%	SS-7A*	ND	ND	
				B8-A 5-6.5	ND	2.5	103%	GW7-B 10-11.5	ND	ND	
				SS-8B*	ND	2.5	87%	B8-A 2.5-4	ND	ND	
				GW8-C 11-11.5	ND	2.5	107%	SS-8A*	ND	ND	
								GW8-C 11-11.5	ND	ND	

* Revised 07/10/87

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Chromium	EPA 200.7	ug/g	5.	GW1-A 10-11.5	19.	50.	84%	GW1-A 10-11.5	23.	19.	ND
				GW1-E 20-21.5	16.	25.	94%	GW1-E 20-21.5	16.	15.	
				SS-1B	12.	50.	101%	SS-1B	11.	11.	
				GW3-B 5-6.5	17.	25.	93%	GW3-D 5-6.5	20.	19.	
				SS-3A	26.	50.	94%	SS-3A	24.	25.	
				SS-5B	21.	25.	103%	GW5-B 9.5-11	21.	20.	
				SS-7A*	ND	25.	99%	SS-7A*	ND	ND	
				B8-A 5-6.5	34.	25.	96%	GW7-B 10-11.5	26.	25.	
				SS-8B*	11.	25.	87%	B8-A 2.5-4	28.	33.	
				GW8-C 11-11.5	25.	25.	98%	SS-8A*	18.	18.	
								GW8-C 11-11.5	25.	25.	
Mercury	EPA 7471	ug/g	0.1	GW1-E 20-21.5	ND	0.5	98%				ND
				SS-1B	ND	0.5	92%				
				B3-A 2.5-4	ND	0.5	102%				
				GW3-B 5-6.5	ND	0.5	103%				
				SS-3C	ND	0.5	98%				
				GW5-B 9.5-11	ND	0.5	88%				
				B7-A 2.5-4	ND	0.25	110%				
				GW7-B 10-11.5	ND	0.05	93%				
				SS-7A*	0.2	0.5	110%				
				B8-A 5-6.5	ND	0.25	83%				
				B8-B 5-6.5	ND	0.25	89%				
				SS-8B*	ND	0.5	96%				

*** Revised 07/10/87**

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Selenium	EPA 3050/7740	ug/g	1.	B1-A 0-1.5	ND	5.	98%	GW1-E 20-22.5	ND	ND	ND
				GW1-E 20-21.5	ND	5.	94%				
				SS-1B	ND	5.	88%				
				B3-A 0-1.5	ND	5.	81%				
				SS-3C	ND	5.	84%				
				GW5-B 9.5-11	ND	5.	81%				
				SS-7A*	ND	9.	108%				
				GW7-A 10-11.5	ND	5.	91%				
				B7-B 2.5-4	ND	9.	66%				
				SS-8B*	ND	9.	99%				
				GW3-D 5-6.5	ND	9.	103%				
				GW3-B 5-6.5	ND	9.	99%				
Ethylene Glycol	P&CAM 338	ug/g	5.	B6-B 0-1.5	ND	36.	84%	B6-B 2.5-4	ND	ND	ND
EP Toxicity	EPA 1310										
Arsenic	EPA 7060	mg/L	0.01	Site 2 DRUM	ND	0.05	82%				ND
				Site 4 0-2.5	ND	0.05	87%				
Barium	EPA 7080	mg/L	0.1	Site 4 0-2.5	0.1	0.7	93%				ND
Cadmium	EPA 7130	mg/L	0.01	Site 2 Drum	ND	0.1	103%				ND
Chromium	EPA 7190	mg/L	0.05	Site 2 Drum	ND	0.5	99%				ND
Lead	EPA 7421	mg/L	0.05	Site 2 Drum	ND	0.5	97%				ND
Mercury	EPA 7470	mg/L	0.001	Site 2 Drum	ND	0.05	100%				ND
				Site 3 Drum	ND	0.05	80%				
				Site 4 0-2.5	ND	0.05	80%				
				GW8-C DRUM	ND	0.05	100%				

* Revised 07/10/87

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Soil Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
EP Toxicity (continued)											
Selenium	EPA 7740	mg/L	0.01	Site 2 Drum	ND	0.05	82%				ND
				Site 8 0-2.5	ND	0.05	93%				
Silver	EPA 7760	mg/L	0.01	Site 8 0-2.5	ND	0.1	91%				ND

"ND" indicates that the parameter was not detected.

DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Purgeable Halocarbons	EPA 601	ug/L	MDL								
Chloroform	EPA 601	ug/L	0.45	SW-3A	ND	10.	103%	SW-2A	ND	ND	ND
				MW-2	ND	10.	107%	MW-2	ND	ND	
				GW3-B	3.6	10.	53%	GW3-B	3.7	3.4	
				GW3-D	2.3	10.	111%	GW3-D	2.2	2.4	
				GW4-A	ND	10.	103%	GW4-A	ND	ND	
				MW-8	ND	10.	116%	MW-8	ND	ND	
				GW5-C	ND	10.	69%	GW5-C	ND	ND	
				SW-5C	ND	10.	97%	SW-5C	ND	ND	
Bromoform	EPA 601	ug/L	0.45	MW-2	ND	10.	81%				ND
				GW3-B	ND	10.	96%				
				GW3-D	ND	10.	86%				
1,1-Dichloroethane	EPA 601	ug/L	0.49					MW-2	ND	ND	ND
								GW3-B	310	320	
								GW3-D	95.	100	
1,2-Dichloroethane	EPA 601	ug/L	0.44	MW-2	ND	10.	109%	MW-2	ND	ND	ND
				GW3-B	4.7	10.	69%	GW3-B	4.8	4.4	
				GW3-D	1.9	10.	103%	GW3-D	1.8	2.0	
1,1,1-Trichloroethane	EPA 601	ug/L	0.53	SW-2A	ND	10.	96%	SW-2A	ND	ND	ND
				GW4-A	ND	10.	117%	MW-2	ND	ND	
				MW-8	ND	10.	111%	GW3-B	2000	19000	
				GW5-C	ND	10.	90%	GW3-D	1400	1300	
				SW-5C	ND	10.	97%	GW4-A	ND	ND	
								MW-8	ND	ND	
								GW5-C	ND	ND	
								SW-5C	ND	ND	

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DATACHEM QUALITY CONTROL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Purgeable Halocarbons (continued)	EPA 601	ug/L	MDL								
1,1-Dichloroethene	EPA 601	ug/L	0.49	SW-2A	ND	10.	99%	SW-2A	ND	ND	ND
				GW4-A	ND	10.	89%	MW-2	ND	ND	
				MW-8	ND	10.	76%	GW3-B	28.	36.	
				GW5-C	ND	10.	89%	GW3-D	46.	48.	
				SW-5C	ND	10.	94%	GW4-A	ND	ND	
							MW-8	ND	ND		
							GW5-C	ND	ND		
							SW-5C	ND	ND		
trans-1,2-Dichloroethene	EPA 601	ug/L	0.42	MW-2	ND	10.	108%				ND
				GW3-B	35.	10.	64%				
				GW3-D	68.	10.	180%				
Trichloroethene	EPA 601	ug/L	0.60	MW-2	ND	10.	86%	SW-2A	ND	ND	ND
				GW3-B	4.4	10.	104%	GW4-A	ND	ND	
				GW3-D	4.4	10.	111%	MW-8	ND	ND	
				SW-2A	ND	10.	92%	GW5-C	ND	ND	
				GW4-A	ND	10.	96%	SW-5C	ND	ND	
				MW-8	ND	10.	109%				
				GW5-C	ND	10.	89%				
				SW-5C	ND	10.	98%				
Tetrachloroethene	EPA 601	ug/L	0.38	SW-2A	ND	10.	87%	SW-2A	ND	ND	ND
				GW4-A	ND	10.	109%	MW-2	ND	ND	
				MW-8	ND	10.	107%	GW3-B	500	460	
				GW5-C	ND	10.	102%	GW3-D	1100	860	
				SW-5C	ND	10.	102%	GW4-A	ND	ND	
							MW-8	ND	ND		
							GW5-C	ND	ND		
							SW-5C	ND	ND		

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Purgeable Halocarbons (continued)	EPA 601	ug/L									
Chlorobenzene	EPA 601	ug/L	0.37	SW-2A	ND	10.	89%	SW-2A	ND	ND	ND
				MW-2	ND	10.	66%	GW4-A	ND	ND	
				GW3-B	ND	10.	89%	MW-8	ND	ND	
				GW3-D	ND	10.	90%	GW5-C	ND	ND	
				GW4-A	ND	10.	106%	SW-5C	ND	ND	
				MW-8	ND	10.	107%				
				GW5-C	ND	10.	97%				
				SW-5C	ND	10.	104%				
Purgeable Aromatics	EPA 602	ug/L	MDL								
Benzene	EPA 602	ug/L	0.25	SW-2A	ND	10.	91%	SW-2A	ND	ND	ND
				MW-2	ND	10.	117%	MW-2	ND	ND	
				GW3-B	ND	10.	152%	GW3-B	ND	ND	
				GW3-D	ND	10.	123%	GW3-D	ND	ND	
				GW4-A	ND	10.	111%	GW4-A	ND	ND	
				MW-8	ND	10.	118%	MW-8	ND	ND	
				GW5-C	ND	10.	82%	GW5-C	ND	ND	
				SW-5C	ND	10.	95%	SW-5C	ND	ND	
Toluene	EPA 602	ug/L	0.64	SW-2A	ND	10.	96%	SW-2A	ND	ND	ND
				MW-2	ND	10.	125%	MW-2	ND	ND	
				GW3-B	36.	10.	61%	GW3-B	35.	38.	
				GW3-D	ND	10.	106%	GW3-D	ND	ND	
				GW4-A	ND	10.	124%	GW4-A	ND	ND	
				MW-8	ND	10.	105%	MW-8	ND	ND	
				GW5-C	ND	10.	84%	GW5-C	ND	ND	
				SW-5C	ND	10.	102%	SW-5C	ND	ND	

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Pesticides	EPA 608	ug/L	MDL								
Aldrin	EPA 608	ug/L	0.007	GW1-C	ND	0.2	90%	GW1-C	ND	ND	ND
				GW3-A	ND	0.2	85%	GW5-A	ND	ND	
				GW3-B	ND	0.2	105%	SW-7A	ND	ND	
				GW5-A	ND	0.2	95%	SW-8A	ND	ND	
								SW-8B	ND	ND	
Lindane	EPA 608	ug/L	0.005	GW1-C	ND	0.2	105%	GW1-C	ND	ND	ND
				GW3-A	ND	0.2	100%	GW5-A	ND	ND	
				GW3-B	ND	0.2	120%	SW-7A	ND	ND	
				GW5-A	ND	0.2	100%	SW-8A	ND	ND	
								SW-8B	ND	ND	
4,4'-DDT	EPA 608	ug/L	0.03	GW1-C	ND	0.5	98%	GW1-C	ND	ND	ND
				GW3-A	ND	0.5	82%	GW5-A	ND	ND	
				GW3-B	ND	0.5	96%	SW-7A	ND	ND	
				GW5-A	ND	0.5	102%	SW-8A	ND	ND	
								SW-8B	ND	ND	
Dieldrin	EPA 608	ug/L	0.005	GW1-C	ND	0.5	96%	GW1-C	ND	ND	ND
				GW3-A	ND	0.5	96%	GW5-A	ND	ND	
				GW3-B	ND	0.5	96%	SW-7A	ND	ND	
				GW5-A	ND	0.5	94%	SW-8A	ND	ND	
								SW-8B	ND	ND	
Endrin	EPA 608	ug/L	0.006	GW1-C	ND	0.5	102%	GW1-C	ND	ND	ND
				GW3-A	ND	0.5	66%	GW5-A	ND	ND	
				GW3-B	ND	0.5	94%	SW-7A	ND	ND	
				GW5-A	ND	0.5	92%	SW-8A	ND	ND	
								SW-8B	ND	ND	

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Pesticides (continued)	EPA 608	ug/L	MDL								
Heptachlor	EPA 608	ug/L	0.007	GW1-C	ND	0.2	100%	GW1-C	ND	ND	ND
				GW3-A	ND	0.2	90%	GW5-A	ND	ND	
				GW3-B	ND	0.2	120%	SW-7A	ND	ND	
				GW5-A	ND	0.2	100%	SW-8A	ND	ND	
								SW-8B	ND	ND	
Herbicides	EPA 615	ug/L	MDL								
2,4-D	EPA 615	ug/L	0.08	GW1-C	ND	12.	66%	GW1-C	ND	ND	ND
				GW3-A	ND	12.	74%	GW3-A	ND	ND	
				GW7-B	ND	12.	73%	GW7-B	ND	ND	
				GW8-C	ND	12.	60%	GW8-A	ND	ND	
2,4,5-T	EPA 615	ug/L	0.08	GW1-C	ND	2.5	64%	GW1-C	ND	ND	ND
				GW3-A	ND	2.5	90%	GW3-A	ND	ND	
				GW7-B	ND	2.5	72%	GW7-B	ND	ND	
				GW8-C	ND	2.5	58%	GW8-A	ND	ND	
Silvex	EPA 615	ug/L	0.08	GW1-C	ND	2.5	78%	GW1-C	ND	ND	ND
				GW3-A	ND	2.5	100%	GW3-A	ND	ND	
				GW7-B	ND	2.5	73%	GW7-B	ND	ND	
				GW8-C	ND	2.5	60%	GW8-A	ND	ND	
Oil and Grease	EPA 413.2	mg/L	1.	SW-1B	ND	1.3	97%	GW2-A	ND	ND	ND
				GW2-D	ND	1.5	96%	GW3-A	ND	ND	
				SW-2A	ND	1.3	99%	SW-7A	2.	1.	
				SW-3C	ND	1.5	99%	GW8-A	ND	ND	
				GW3-C	ND	1.3	93%	GW8-B	ND	ND	
				SW-4B	1.	1.6	122%	GW8-C	ND	ND	
				GW4-B	ND	1.3	97%	SW-8A	ND	ND	
				GW4-C	ND	1.3	100%				
				SW-5C	ND	1.3	105%				
				GW8-B	ND	1.3	94%				

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Phenolics	EPA 420.2	ug/L	5.	SW-1A	ND	60.	109%	MW-4	ND	ND	ND
				SW-2A	ND	60.	100%	MW-7	ND	ND	
				MW-2	ND	60.	102%	GW2-C	ND	ND	
				MW-5	ND	60.	112%	GW3-B	19.	17.	
				SW-3A	ND	60.	106%	GW5-C	ND	ND	
				SW-5A	ND	60.	107%	GW7-B	ND	ND	
				GW5-A	ND	60.	114%	SW-8B	9.	9.	
				GW8-C	ND	60.	107%	GW8-C	ND	ND	
				GW3-B	16.	60.	104%				
Arsenic	EPA 206.2	mg/L	0.01	SW-1B	ND	0.09	82%	GW1-E	ND	ND	ND
				SW-3A	ND	0.09	98%	GW8-B	ND	ND	
				SW-5A	ND	0.09	86%	SW-8B	ND	ND	
				GW5-B	ND	0.05	60%				
				GW5-C	ND	0.05	50%				
				SW-8A	ND	0.05	92%				
				SW-8B	ND	0.05	77%				
Barium	EPA 208.1	mg/L	0.2	SW-1A	ND	0.95	99%	GW1-E	0.5	0.2	ND
				GW1-E	0.5	0.48	95%	GW8-B	0.5	ND	
				SW-3C	ND	0.95	99%	SW-8B	ND	ND	
				SW-5C	ND	0.95	99%				
				GW7-A	0.5	0.48	91%				
				GW7-C	ND	0.95	104%				
				SW-8A	ND	0.48	119%				
				SW-8B	ND	0.48	117%				
				GW8-B	0.2	0.95	102%				

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DATACHEM QUALITY CONTROL REPORT
Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Cadmium	EPA 213.1	mg/L	0.01	SW-1A	ND	0.10	107%	GW1-E	ND	ND	ND
				SW-3C	0.05	0.10	102%	GW8-B	ND	ND	
				SW-5C	ND	0.10	111%	SW-8B	ND	ND	
				SW-7A	ND	0.05	97%				
				GW7-C	0.02	0.10	94%				
				SW-8B	ND	0.05	101%				
Chromium	EPA 218.1	mg/L	0.05	SW-1A	ND	0.48	97%	GW1-E	0.10	0.08	ND
				GW1-E	0.10	0.24	124%	GW8-B	0.30	0.10	
				SW-3C	ND	0.48	110%	SW-8B	ND	ND	
				SW-5C	0.05	0.48	97%				
				GW7-A	0.11	0.48	111%				
				GW7-C	0.14	0.24	86%				
				SW-8A	ND	0.24	114%				
				SW-8B	ND	0.24	104%				
Lead	EPA 239.2	mg/L	0.02	SW-3A	0.04	0.05	120%	GW1-E	ND	ND	ND
				BAIL RNSE 7	ND	0.05	85%	GW8-B	ND	ND	
				SW-8A	0.04	0.05	97%	SW-8B	0.04	0.03	
				SW-8B	0.03	0.05	85%				
Silver	EPA 272.1	mg/L	0.01	SW-1A	ND	0.10	101%	GW1-E	ND	ND	ND
				SW-3C	ND	0.10	97%	GW8-B	ND	ND	
				SW-5C	ND	0.10	94%	SW-8B	ND	ND	
				GW5-B	ND	0.10	96%				
				GW5-C	ND	0.10	102%				
				SW-7A	ND	0.05	97%				
				GW7-C	ND	0.24	93%				
				SW-8B	ND	0.05	97%				

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DATACHEM QUALITY CONTROL REPORT

Duluth IAP - Water Samples

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Selenium	EPA 270.2	mg/L	0.01	SW-1B	ND	0.09	72%	GW1-E	ND	ND	ND
				SW-3A	ND	0.09	72%	GW8-B	ND	ND	
				SW-5A	ND	0.09	78%	SW-8B	ND	ND	
				GW7-B	ND	0.05	80%				
				SW-8A	ND	0.05	107%				
				SW-8B	ND	0.05	70%				
Mercury	EPA 245.1	mg/L	0.001	GW3-A	ND	0.002	95%	GW1-E	ND	ND	ND
				GW3-C	ND	0.002	95%	SW-7A	ND	ND	
				GW3-D	ND	0.002	100%	SW-8B	ND	ND	
				RNSE BLK 5	ND	0.001	110%	GW8-B	ND	ND	
				GW7-B	ND	0.001	100%				
				SW-7A	ND	0.001	100%				
				BAIL RNSE 7	ND	0.002	110%				
				GW7-A	ND	0.001	120%				
				GW8-A	ND	0.002	100%				
				SW-8A	ND	0.001	110%				
				GW8-C DRM	ND	0.001	100%				
Radiology											
Gross Alpha	Std. Method 703	p Ci/L	1.				GW10-B	18.	16.	ND	
Gross Beta	Std. Method 703	p Ci/L	1.				GW10-B	12.	8.	ND	
Radium-226	Std. Method 706	p Ci/L	0.6				GW10-B	5.0	ND	ND	
Radium-228	Std. Method 708	p Ci/L	1.				GW10-B	18.	ND	ND	

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Halocarbons	EPA 8010 (*)	ug/g	MDL (**)										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

(*) Methods documented in previous Analytical Reports Section.
(**) MDL values documented in previous Analytical Reports Section.

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-3B THREE	SS-3C THREE	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.5 FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	0.0053	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloronthane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL									
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 9010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL			
Bromodichloromethane (f)	EPA 8010	ug/g	0.0018		ND	ND
Bromodichloromethane (s)	EPA 8010	ug/g	0.0018		NEG	NEG
Bromoform (f)	EPA 8010	ug/g	0.0022		ND	ND
Bromoform (s)	EPA 8010	ug/g	0.0022		NEG	NEG
Bromomethane (f)	EPA 8010	ug/g	0.0032		ND	ND
Bromomethane (s)	EPA 8010	ug/g	0.0032		NEG	NEG
Carbon Tetrachloride (f)	EPA 8010	ug/g	0.0023		ND	ND
Carbon Tetrachloride (s)	EPA 8010	ug/g	0.0023		NEG	NEG
Chlorobenzene (f)	EPA 8010	ug/g	0.0018		ND	ND
Chlorobenzene (s)	EPA 8010	ug/g	0.0018		NEG	NEG
Chloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND
Chloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 8010	ug/g	0.0022		ND	ND
2-Chloroethylvinyl Ether (s)	EPA 8010	ug/g	0.0022		NEG	NEG
Chloroform (f)	EPA 8010	ug/g	0.0022		ND	ND
Chloroform (s)	EPA 8010	ug/g	0.0022		NEG	NEG
Chloromethane (f)	EPA 8010	ug/g	0.0024		ND	ND
Chloromethane (s)	EPA 8010	ug/g	0.0024		NEG	NEG
Dibromochloromethane (f)	EPA 8010	ug/g	0.0016		ND	ND
Dibromochloromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Halocarbons	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	0.005	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	0.016
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	0.0075
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	0.14
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #:	SS-3B	SS-3C	B4-C 2.5-4	B4-C 5-6.5	B4-C 7.5-9	B4-D 2.5-4	B4-D 5-6.5	B4-D 7.5-9	B4-E 2.5-4
				Site :	THREE	THREE	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		0.033	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		0.018	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		0.0029	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL									
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	0.0070
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	0.024
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL										
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Halocarbons (cont.)	EPA 8010	ug/g	MDL			
1,2-Dichlorobenzene (f)	EPA 8010	ug/g	0.0014		ND	ND
1,2-Dichlorobenzene (s)	EPA 8010	ug/g	0.0014		NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8010	ug/g	0.0021		ND	ND
1,3-Dichlorobenzene (s)	EPA 8010	ug/g	0.0021		NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8010	ug/g	0.0020		ND	ND
1,4-Dichlorobenzene (s)	EPA 8010	ug/g	0.0020		NEG	NEG
Dichlorodifluoromethane (f)	EPA 8010	ug/g	0.0016		ND	ND
Dichlorodifluoromethane (s)	EPA 8010	ug/g	0.0016		NEG	NEG
1,1-Dichloroethane (f)	EPA 8010	ug/g	0.0025		ND	ND
1,1-Dichloroethane (s)	EPA 8010	ug/g	0.0025		NEG	NEG
1,2-Dichloroethane (f)	EPA 8010	ug/g	0.0022		ND	ND
1,2-Dichloroethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG
1,1-Dichloroethene (f)	EPA 8010	ug/g	0.0025		ND	ND
1,1-Dichloroethene (s)	EPA 8010	ug/g	0.0025		NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 8010	ug/g	0.0021		ND	ND
trans-1,2-Dichloroethene (s)	EPA 8010	ug/g	0.0021		NEG	NEG
1,2-Dichloropropane (f)	EPA 8010	ug/g	0.0010		ND	ND
1,2-Dichloropropane (s)	EPA 8010	ug/g	0.0010		NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND
cis-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Halocarbons	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MQL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	0.0076	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	0.006	0.017	0.083	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	POS	POS	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" Indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	0.0085	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	0.38	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	0.0042
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	0.010
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	0.027
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	SS-3B THREE	SS-3C THREE	B4-C 2.5-4 FOUR	B4-C 5-6.5 FOUR	B4-C 7.5-9 FOUR	B4-D 2.5-4 FOUR	B4-D 5-6.. FOUR	B4-D 7.5-9 FOUR	B4-E 2.5-4 FOUR
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	0.062	0.10	0.40	0.082	0.33	0.15	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		0.0019	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		1.5	0.013	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		POS	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		0.026	0.0053	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		POS	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	0.079	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	0.013	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL									
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MQL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND*	0.0035*	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG*	POS*	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL										
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	0.0074	0.0088	0.019	ND	ND	0.037	0.036	ND
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Halocarbons (cont)	EPA 8010	ug/g	MDL			
trans-1,3-Dichloropropene (f)	EPA 8010	ug/g	0.0048		ND	ND
trans-1,3-Dichloropropene (s)	EPA 8010	ug/g	0.0048		NEG	NEG
Methylene Chloride (f)	EPA 8010	ug/g	0.0017		ND	0.0049
Methylene Chloride (s)	EPA 8010	ug/g	0.0017		NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 8010	ug/g	0.0019		ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 8010	ug/g	0.0019		NEG	NEG
Tetrachloroethene (f)	EPA 8010	ug/g	0.0019		ND	ND
Tetrachloroethene (s)	EPA 8010	ug/g	0.0019		NEG	NEG
1,1,1-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND
1,1,1-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG
1,1,2-Trichloroethane (f)	EPA 8010	ug/g	0.0026		ND	ND
1,1,2-Trichloroethane (s)	EPA 8010	ug/g	0.0026		NEG	NEG
Trichloroethene (TCE) (f)	EPA 8010	ug/g	0.0030		ND	ND
Trichloroethene (TCE) (s)	EPA 8010	ug/g	0.0030		NEG	NEG
Trichlorofluoromethane (f)	EPA 8010	ug/g	0.0022		ND	ND
Trichlorofluoromethane (s)	EPA 8010	ug/g	0.0022		NEG	NEG
Vinyl Chloride (f)	EPA 8010	ug/g	0.0027		ND	ND
Vinyl Chloride (s)	EPA 8010	ug/g	0.0027		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE	B2-B 0-1.5 TWO
Purgeable Aromatics	EPA 8020	ug/g	MDL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	0.0071	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	0.043	ND	ND	ND	0.0071	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	0.094	ND	ND	ND	0.10	1.0	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	POS	NEG	NEG	NEG	POS	POS	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	0.043	ND	ND	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B2-B 2.5-4 TWO	B2-B 5-6.5 TWO	B2-C 0-1.5 TWO	B2-C 2.5-4 TWO	B2-C 5-6.5 TWO	GW2-A 5-6.5 TWO	GW2-B 5-6.5 TWO	GW2-C 15-16.5 TWO	GW2-D 15-16.5 TWO
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	0.014	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	0.35	ND	0.011	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	POS	NEG	POS	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	0.54	ND	0.0088	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	POS	NEG	POS	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	1.8	ND	0.076	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	POS	NEG	POS	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-E 15-16.5 TWO	SS-2A TWO	SS-2B TWO	SS-2C TWO	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	0.16	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	0.018	ND	0.018	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	POS	NEG	POS	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	0.057	0.73	0.47	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	POS	POS	POS	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE	B3-C 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MQL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	0.014
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #:	SS-3B	SS-3C	B4-C 2.5-4	B4-C 5-6.5	B4-C 7.5-9	B4-D 2.5-4	B4-D 5-6.5	B4-D 7.5-9	B4-E 2.5-4
				Site :	THREE	THREE	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MCL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B4-E 5-6.5 FOUR	GW4-A 10-11.5 FOUR	GW4-B 5-6.5 FOUR	GW4-C 10-12 FOUR	GW4-D 5-6.5 FOUR	B4-A 2.5-4 FOUR	B4-A 5-6.5 FOUR	B4-A 7.5-9 FOUR	B4-B 2.5-4 FOUR
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	1.6
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	3.2
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	0.0099	6.4
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS	POS
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	ND	ND	ND	0.21	82.
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS	POS

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B4-B 5-6.5 FOUR	B4-B 7.5-11.5 FOUR	SS-4A FOUR	SS-4B FOUR	SS-4C FOUR	SS-4D FOUR	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL									
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	6.8	ND	0.86	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	POS	NEG	POS	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	170	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		3.5	0.011	ND	21.	2.4	3.5	ND	0.0075
Toluene (s)	EPA 8020	ug/g	0.0032		POS	POS	NEG	POS	POS	POS	NEG	POS
Xylenes (f)	EPA 8020	ug/g	0.0061		30.	0.087	ND	15.	4.9	11.	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		POS	POS	NEG	POS	POS	POS	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B6-A 0-1.5 SIX	B6-A 2.5-4 SIX	B6-B 0-1.5 SIX
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MQL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	0.045	0.012	0.031	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	0.012	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	0.063	ND	ND	ND	0.025	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B6-B 2.5-4 SIX	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

ND* Indicates ... the ... mete... s no ... ect...

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MQL										
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Purgeable Aromatics (cont.)	EPA 8020	ug/g	MDL			
Benzene (f)	EPA 8020	ug/g	0.0013		ND	ND
Benzene (s)	EPA 8020	ug/g	0.0013		NEG	NEG
Chlorobenzene (f)	EPA 8020	ug/g	0.0018		ND	ND
Chlorobenzene (s)	EPA 8020	ug/g	0.0018		NEG	NEG
1,2-Dichlorobenzene (f)	EPA 8020	ug/g	0.0023		ND	ND
1,2-Dichlorobenzene (s)	EPA 8020	ug/g	0.0023		NEG	NEG
1,3-Dichlorobenzene (f)	EPA 8020	ug/g	0.0046		ND	ND
1,3-Dichlorobenzene (s)	EPA 8020	ug/g	0.0046		NEG	NEG
1,4-Dichlorobenzene (f)	EPA 8020	ug/g	0.0022		ND	ND
1,4-Dichlorobenzene (s)	EPA 8020	ug/g	0.0022		NEG	NEG
Ethylbenzene (f)	EPA 8020	ug/g	0.0038		ND	ND
Ethylbenzene (s)	EPA 8020	ug/g	0.0038		NEG	NEG
Toluene (f)	EPA 8020	ug/g	0.0032		ND	9.4
Toluene (s)	EPA 8020	ug/g	0.0032		NEG	POS
Xylenes (f)	EPA 8020	ug/g	0.0061		ND	ND
Xylenes (s)	EPA 8020	ug/g	0.0061		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2-5.4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Pesticides	EPA 3550/8080	ug/g	MDL									
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/3080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	0.02	0.002	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	0.02	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		ND	0.02	ND	ND	ND	ND	ND	ND
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MQL										
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		ND	ND	ND	ND	ND	ND	0.006	0.0009	0.002
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	0.09	ND	0.41	2.1	0.004	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	NEG	NEG	POS	POS	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND	0.008
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		0.01	ND	0.008	0.08	ND	ND	0.10	0.09	0.02
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		POS	NEG	NEG	POS	NEG	NEG	POS	POS	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS-3B THREE	SS-3C THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL								
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	0.02	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		ND	0.002	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	POS	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		0.003	ND	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		POS	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	0.02	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	POS	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		0.06	0.04	ND	0.007	ND	ND	ND
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		POS	POS	NEG	POS	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	ND	ND	ND	0.06	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		0.02	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		ND	0.07	ND	ND	ND	ND*	0.004*	0.07*
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		NEG	POS	NEG	NEG	NEG	NEG*	POS	POS*

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MQL										
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	ND	0.001	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		0.004	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	ND	ND	0.006	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	ND	ND	0.007	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		0.004	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL			
Aldrin (f)	EPA 3550/8080	ug/g	0.002		ND	ND
Aldrin (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG
alpha-BHC (f)	EPA 3550/8080	ug/g	0.0008		ND	ND
alpha-BHC (s)	EPA 3550/8080	ug/g	0.0008		NEG	NEG
beta-BHC (f)	EPA 3550/8080	ug/g	0.0002		ND	0.12
beta-BHC (s)	EPA 3550/8080	ug/g	0.0002		NEG	NEG
delta-BHC (f)	EPA 3550/8080	ug/g	0.0006		0.001	ND
delta-BHC (s)	EPA 3550/8080	ug/g	0.0006		POS	NEG
Lindane (f)	EPA 3550/8080	ug/g	0.003		ND	ND
Lindane (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG
Chlordane (f)	EPA 3550/8080	ug/g	0.05		ND	ND
Chlordane (s)	EPA 3550/8080	ug/g	0.05		NEG	NEG
4,4'-DDD (f)	EPA 3550/8080	ug/g	0.0004		ND	ND
4,4'-DDD (s)	EPA 3550/8080	ug/g	0.0004		NEG	NEG
4,4'-DDE (f)	EPA 3550/8080	ug/g	0.007		ND	ND
4,4'-DDE (s)	EPA 3550/8080	ug/g	0.007		NEG	NEG
4,4'-DDT (f)	EPA 3550/8080	ug/g	0.004		ND	ND
4,4'-DDT (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B1-A 0-1.5 ONE	B1-A 2-5.4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		0.10	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	0.02	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MQL										
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	0.02	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	0.05	0.002	ND	ND	ND	0.009	0.004	0.003
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	0.002	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	0.001	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS-3B THREE	SS-3C THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL								
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	0.004	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	0.31	0.06	0.01
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	POS	POS	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 355C/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	0.02
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL										
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		0.001	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		0.002	ND	0.005	ND	ND	0.002	0.001	ND	ND
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SS-8A* EIGHT	SS-8B* EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL			
Dieldrin (f)	EPA 3550/8080	ug/g	0.003		ND	ND
Dieldrin (s)	EPA 3550/8080	ug/g	0.003		NEG	NEG
Endosulfan I (f)	EPA 3550/8080	ug/g	0.002		ND	0.01
Endosulfan I (s)	EPA 3550/8080	ug/g	0.002		NEG	POS
Endosulfan II (f)	EPA 3550/8080	ug/g	0.001		ND	ND
Endosulfan II (s)	EPA 3550/8080	ug/g	0.001		NEG	NEG
Endosulfan Sulfate (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Endosulfan Sulfate (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Endrin (f)	EPA 3550/8080	ug/g	0.005		ND	ND
Endrin (s)	EPA 3550/8080	ug/g	0.005		NEG	NEG
Endrin Aldehyde (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Endrin Aldehyde (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Heptachlor (f)	EPA 3550/8080	ug/g	0.004		ND	ND
Heptachlor (s)	EPA 3550/8080	ug/g	0.004		NEG	NEG
Heptachlor Epoxide (f)	EPA 3550/8080	ug/g	0.002		ND	ND
Heptachlor Epoxide (s)	EPA 3550/8080	ug/g	0.002		NEG	NEG
Toxaphene (f)	EPA 3550/8080	ug/g	0.14		ND	ND
Toxaphene (s)	EPA 3550/8080	ug/g	0.14		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2-5.4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL										
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS-3B THREE	SS-3C THREE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL								
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8030	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	1.1	0.17	0.04
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	POS	POS	POS

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B7-A 0-1.5 SEVEN	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL									
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

... was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL										
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT

Duluth IAP - Soil Samples

Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	SS-8A* EIGHT	SS-8B* EIGHT
Pesticides (cont.)	EPA 3550/8080	ug/g	MDL			
Arochlor 1016 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1016 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Arochlor 1221 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1221 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Arochlor 1232 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1232 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Arochlor 1242 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1242 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Arochlor 1248 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1248 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG
Arochlor 1254 (f)	EPA 3550/8080	ug/g	0.02		ND	0.52
Arochlor 1254 (s)	EPA 3550/8080	ug/g	0.02		NEG	POS
Arochlor 1260 (f)	EPA 3550/8080	ug/g	0.02		ND	ND
Arochlor 1260 (s)	EPA 3550/8080	ug/g	0.02		NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B1-A 0-1.5 ONE	B1-A 2.5-4 ONE	B1-A 5-6.5 ONE	GW1-A 10-11.5 ONE	GW1-B 5-6.5 ONE	GW1-E 20-21.5 ONE	SS-1A ONE	SS-1B ONE
Herbicides	EPA 3550/8150	ug/g	MDL									
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		ND	0.082	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B3-A 0-1.5 THREE	B3-A 2.5-4 THREE	B3-A 5-6.5 THREE	B3-B 0-1.5 THREE	B3-B 2.5-4 THREE	B3-B 5-6.5 THREE	B3-C 0-1.5 THREE	B3-C 2.5-4 THREE	B3-C 5-6.5 THREE
Herbicides	EPA 3550/8150	ug/g	MDL										
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	0.18	0.23	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	BC-3 5-6.5 THREE	GW3-A 5-6.5 THREE	GW3-B 5-6.5 THREE	GW3-D 5-6.5 THREE	SS-3A THREE	SS-3B THREE	SS-3C THREE
Herbicides	EPA 3550/8150	ug/g	MDL								
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW5-A 5-6.5 FIVE	GW5-B 9.5-11 FIVE	GW5-C 10-11.5 FIVE	SS-5A FIVE	SS-5B FIVE	SS-5C FIVE	SS-5D FIVE	SS-5E FIVE	B7-A 0-1.5 SEVEN
Herbicides	EPA 3550/8150	ug/g	MDL										
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B7-A 2.5-4 SEVEN	B7-B 0-1.5 SEVEN	B7-B 2.5-4 SEVEN	GW7-A 10-11.5 SEVEN	GW7-B 10-11.5 SEVEN	GW7-C 15-16.5 SEVEN	SS-7A* SEVEN	SS-8A* EIGHT	SS-8B* EIGHT
Herbicides	EPA 3550/8150	ug/g	MDL										
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		0.12	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

* Revised 07/10/87

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Soil Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	B8-A 0-1.5 EIGHT	B8-A 2.5-4 EIGHT	B8-A 5-6.5 EIGHT	B8-B 0-1.5 EIGHT	B8-B 2.5-4 EIGHT	B8-B 5-6.5 EIGHT	GW8-A 5-6.5 EIGHT	GW8-B 10-11.5 EIGHT	GW8-C 10-11.5 EIGHT
Herbicides	EPA 3550/8150	ug/g	MDL										
2,4,5-T (f)	EPA 3550/8150	ug/g	0.10		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 3550/8150	ug/g	0.10		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 3550/8150	ug/g	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 3550/8150	ug/g	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	ND	ND	6.0	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	4.4	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	ND	0.87	ND	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND	ND	1.0	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	0.88	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	ND	ND	3.6	ND	2.3	ND	1.6	1.4
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	POS	NEG	POS	NEG	POS	POS
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	ND	ND	ND	2.1	2.3	2.8	3.5	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	NEG	NEG	NEG	POS	POS	POS	POS	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	.94	.55	.58	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	5.5
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Chloroform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	ND	ND	ND	ND	ND	2.7	2.9	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	1.9	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	2.5	ND	ND	ND	2.8	ND	ND	ND
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	POS	NEG	NEG	NEG	POS	NEG	NEG	NEG
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	2.9	ND	ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	1.2	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	7.0	ND	ND	ND	ND	ND	ND	ND
Chloroform (s)	EPA 601	ug/L	0.45		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL					
Chloromethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND
Chloromethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG
Methylene Chloride (f)	EPA 601	ug/L	0.34		ND	ND	ND	35.
Methylene Chloride (s)	EPA 601	ug/L	0.34		NEG	NEG	NEG	POS
Carbon Tetrachloride (f)	EPA 601	ug/L	0.46		ND	ND	ND	ND
Carbon Tetrachloride (s)	EPA 601	ug/L	0.46		NEG	NEG	NEG	NEG
Bromodichloromethane (f)	EPA 601	ug/L	0.35		ND	ND	ND	1.5
Bromodichloromethane (s)	EPA 601	ug/L	0.35		NEG	NEG	NEG	POS
Dibromochloromethane (f)	EPA 601	ug/L	0.31		ND	ND	ND	ND
Dibromochloromethane (s)	EPA 601	ug/L	0.31		NEG	NEG	NEG	NEG
Bromomethane (f)	EPA 601	ug/L	0.63		ND	ND	ND	ND
Bromomethane (s)	EPA 601	ug/L	0.63		NEG	NEG	NEG	NEG
Dichlorodifluoromethane (f)	EPA 601	ug/L	0.33		ND	ND	ND	ND
Dichlorodifluoromethane (s)	EPA 601	ug/L	0.33		NEG	NEG	NEG	NEG
Trichlorofluoromethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND
Trichlorofluoromethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG
Chloroform (f)	EPA 601	ug/L	0.45		ND	5.4	ND	9.8
Chloroform (s)	EPA 601	ug/L	0.45		NEG	POS	NEG	POS
Bromoform (f)	EPA 601	ug/L	0.45		ND	ND	ND	ND
Bromoform (s)	EPA 601	ug/L	0.45		NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	ND	ND	2.9	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	4.8	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		13.	66.	ND	ND	2.6	2.3	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		POS	POS	NEG	NEG	POS	POS	NEG	NEG	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	20.	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	0.70	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	310	83.	97.	6.8	36.	37.
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	4.7	ND	1.9	ND	3.0	2.8
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	POS	NEG	POS	NEG	POS	POS
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	1900	83.	1400	25.	1400	970
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	9.1	6.0	4.8	3.0
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	POS	POS	POS	POS
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	30.	0.69	47.	5.7	35.	26.
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	ND	ND	35.	260	68.	82.	70.	55.
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	ND	ND	4.4	31.	4.4	740	570	350
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	ND	ND	ND	19.	10.	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG	NEG	NEG	POS	POS	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	4.0	4.4	2.2	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	POS	POS	POS	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	ND	ND	ND	ND	22.	16.	9.6	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	NEG	NEG	NEG	NEG	POS	POS	POS	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	5.8	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	0.82	ND	0.83	ND	ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	POS	NEG	POS	NEG	NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	ND	ND	7.2	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	220	1.1	5.1	ND	ND	ND	ND	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	POS	POS	POS	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL					
Chloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND
Chloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NE
1,1-Dichloroethane (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND
1,1-Dichloroethane (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG
1,2-Dichloroethane (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND
1,2-Dichloroethane (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG
1,1,1-Trichloroethane (f)	EPA 601	ug/L	0.53		ND	ND	ND	ND
1,1,1-Trichloroethane (s)	EPA 601	ug/L	0.53		NEG	NEG	NEG	NEG
1,1,2-Trichloroethane (f)	EPA 601	ug/L	0.51		ND	ND	ND	ND
1,1,2-Trichloroethane (s)	EPA 601	ug/L	0.51		NEG	NEG	NEG	NEG
1,1,2,2-Tetrachloroethane (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND
1,1,2,2-Tetrachloroethane (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG
Vinyl Chloride (f)	EPA 601	ug/L	0.54		ND	ND	ND	ND
Vinyl Chloride (s)	EPA 601	ug/L	0.54		NEG	NEG	NEG	NEG
1,1-Dichloroethene (f)	EPA 601	ug/L	0.49		ND	ND	ND	ND
1,1-Dichloroethene (s)	EPA 601	ug/L	0.49		NEG	NEG	NEG	NEG
trans-1,2-Dichloroethene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND
trans-1,2-Dichloroethene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG
Trichloroethene (f)	EPA 601	ug/L	0.60		ND	ND	ND	ND
Trichloroethene (s)	EPA 601	ug/L	0.60		NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	490	430	1000	10.	10.	8.1
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	POS	POS	POS	POS	POS	POS
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	0.98	2.2	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	POS	POS	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Halocarbons	EPA 601	ug/L	MDL										
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	7.6	ND	ND	ND	ND	ND
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK THREE
Purgeable Halocarbons	EPA 601	ug/L	MDL					
Tetrachloroethene (f)	EPA 601	ug/L	0.38		ND	ND	ND	0.52
Tetrachloroethene (s)	EPA 601	ug/L	0.38		NEG	NEG	NEG	POS
1,2-Dichloropropane (f)	EPA 601	ug/L	0.20		ND	ND	ND	ND
1,2-Dichloropropane (s)	EPA 601	ug/L	0.20		NEG	NEG	NEG	NEG
cis-1,3-Dichloropropene (f)	EPA 601	ug/L	0.58		ND	ND	ND	ND
cis-1,3-Dichloropropene (s)	EPA 601	ug/L	0.58		NEG	NEG	NEG	NEG
trans-1,3-Dichloropropene (f)	EPA 601	ug/L	0.39		ND	ND	ND	ND
trans-1,3-Dichloropropene (s)	EPA 601	ug/L	0.39		NEG	NEG	NEG	NEG
2-Chloroethylvinyl Ether (f)	EPA 601	ug/L	0.44		ND	ND	ND	ND
2-Chloroethylvinyl Ether (s)	EPA 601	ug/L	0.44		NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 601	ug/L	0.37		ND	ND	ND	ND
Chlorobenzene (s)	EPA 601	ug/L	0.37		NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 601	ug/L	0.29		ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 601	ug/L	0.29		NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 601	ug/L	0.42		ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 601	ug/L	0.42		NEG	NEG	NEG	NEG
1,4-Dichlorobenzene (f)	EPA 601	ug/L	0.41		ND	ND	ND	ND
1,4-Dichlorobenzene (s)	EPA 601	ug/L	0.41		NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW2-A TWO	GW2-B TWO	GW2-C TWO
Purgeable Aromatics	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	NC	ND	ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EFA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW2-D TWO	GW2-E TWO	SW-2A TWO	SW-2B TWO	SW-2C TWO	MW-1 TWO	MW-2 TWO	MW-4 TWO	MW-5 TWO
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" Indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-6 TWO	MW-7 TWO	GW3-A THREE	GW3-B THREE	GW3-C THREE	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	36.	ND	ND	ND	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	POS	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW4-A FOUR	GW4-B FOUR	GW4-C FOUR	GW4-D FOUR	SW-4A FOUR	SW-4B FOUR	SW-4C FOUR	SW-4D FOUR	MW-8 FOUR
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	15.	89.	6.8	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	POS	POS	POS	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND	ND	ND	2.0	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND	ND	ND	73.	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	POS	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	1.6	2.8	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	POS	POS	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	MW-9 FOUR	MW-10 FOUR	MW-11 FOUR	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE	SW-5C FIVE
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT	SW-8B EIGHT
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL										
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND	ND	ND	ND	ND	6.5
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	TRIP BLANK FOUR	TRIP BLANK SEVEN	TRIP BLANK EIGHT	RINSE BLANK THREE
Purgeable Aromatics (cont.)	EPA 602	ug/L	MDL					
Benzene (f)	EPA 602	ug/L	0.25		ND	ND	ND	ND
Benzene (s)	EPA 602	ug/L	0.25		NEG	NEG	NEG	NEG
Toluene (f)	EPA 602	ug/L	0.64		ND	ND	ND	ND
Toluene (s)	EPA 602	ug/L	0.64		NEG	NEG	NEG	NEG
Ethylbenzene (f)	EPA 602	ug/L	0.75		ND	ND	ND	ND
Ethylbenzene (s)	EPA 602	ug/L	0.75		NEG	NEG	NEG	NEG
o-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND
o-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG
m-Xylene (f)	EPA 602	ug/L	0.45		ND	ND	ND	ND
m-Xylene (s)	EPA 602	ug/L	0.45		NEG	NEG	NEG	NEG
p-Xylene (f)	EPA 602	ug/L	0.78		ND	ND	ND	ND
p-Xylene (s)	EPA 602	ug/L	0.78		NEG	NEG	NEG	NEG
Chlorobenzene (f)	EPA 602	ug/L	0.35		ND	ND	ND	ND
Chlorobenzene (s)	EPA 602	ug/L	0.35		NEG	NEG	NEG	NEG
1,1-Dichlorobenzene (f)	EPA 602	ug/L	0.47		ND	ND	ND	ND
1,1-Dichlorobenzene (s)	EPA 602	ug/L	0.47		NEG	NEG	NEG	NEG
1,2-Dichlorobenzene (f)	EPA 602	ug/L	0.93		ND	ND	ND	ND
1,2-Dichlorobenzene (s)	EPA 602	ug/L	0.93		NEG	NEG	NEG	NEG
1,3-Dichlorobenzene (f)	EPA 602	ug/L	0.44		ND	ND	ND	ND
1,3-Dichlorobenzene (s)	EPA 602	ug/L	0.44		NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit		Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides	EPA 608	ug/L	MDL (A)	MDL (t)										
Aldrin (f)	EPA 608	ug/L	0.007	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 608	ug/L	0.007	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 608	ug/L	0.006	0.004		ND	ND	ND	ND	0.01	0.02	ND	0.06	0.02
alpha-BHC (s)	EPA 608	ug/L	0.006	0.004		NEG	NEG	NEG	NEG	POS	POS	NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	0.006	0.005		ND	ND	ND	ND	0.09	0.19	ND	ND	ND
beta-BHC (s)	EPA 608	ug/L	0.006	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 608	ug/L	0.002	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 608	ug/L	0.002	0.006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 608	ug/L	0.005	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 608	ug/L	0.005	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 608	ug/L	0.01	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 608	ug/L	0.01	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 608	ug/L	0.004	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 608	ug/L	0.004	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 608	ug/L	0.005	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 608	ug/L	0.005	0.006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 608	ug/L	0.03	0.01		ND	ND	ND	ND	ND	ND	ND	0.02	ND
4,4'-DDT (s)	EPA 608	ug/L	0.03	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit MDL (A)	Detection Limit MDL (†)	Field #: / Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	SW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Pesticides (cont.)	EPA 608	ug/L												
Aldrin (f)	EPA 608	ug/L	0.007	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 608	ug/L	0.007	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 608	ug/L	0.006	0.004		ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 608	ug/L	0.006	0.004		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	0.006	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 608	ug/L	0.006	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 608	ug/L	0.002	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 608	ug/L	0.002	0.006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 608	ug/L	0.005	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 608	ug/L	0.005	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 608	ug/L	0.01	0.05		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 608	ug/L	0.01	0.05		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 608	ug/L	0.004	0.003		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD (s)	EPA 608	ug/L	0.004	0.003		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDE (f)	EPA 608	ug/L	0.005	0.006		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 608	ug/L	0.005	0.006		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 608	ug/L	0.03	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT (s)	EPA 608	ug/L	0.03	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit MDL (A)	Detection Limit MDL (f)	Field #: SW-5C Site: FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Pesticides (cont.)	EPA 608	ug/L											
Aldrin (f)	EPA 608	ug/L	0.007	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin (s)	EPA 608	ug/L	0.007	0.02	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
alpha-BHC (f)	EPA 608	ug/L	0.006	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC (s)	EPA 608	ug/L	0.006	0.004	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	0.006	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC (s)	EPA 608	ug/L	0.006	0.005	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
delta-BHC (f)	EPA 608	ug/L	0.002	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC (s)	EPA 608	ug/L	0.002	0.006	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Lindane (f)	EPA 608	ug/L	0.005	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lindane (s)	EPA 608	ug/L	0.005	0.005	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Chlordane (f)	EPA 608	ug/L	0.01	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane (s)	EPA 608	ug/L	0.01	0.05	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDD (f)	EPA 608	ug/L	0.004	0.003	ND	ND	ND	ND	ND	ND	ND	ND	0.009
4,4'-DDD (s)	EPA 608	ug/L	0.004	0.003	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	POS
4,4'-DDE (f)	EPA 608	ug/L	0.005	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE (s)	EPA 608	ug/L	0.005	0.006	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
4,4'-DDT (f)	EPA 608	ug/L	0.03	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT (s)	EPA 608	ug/L	0.03	0.01	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit		Field #: / Site :	SW-8B / EIGHT	TRIP BLANK ONE	TRIP BLANK SEVEN
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (t)				
Aldrin (f)	EPA 608	ug/L	0.007	0.02		ND	ND	ND
Aldrin (s)	EPA 608	ug/L	0.007	0.02		NEG	NEG	NEG
alpha-BHC (f)	EPA 608	ug/L	0.006	0.004		ND	ND	ND
alpha-BHC (s)	EPA 608	ug/L	0.006	0.004		NEG	NEG	NEG
beta-BHC (f)	EPA 608	ug/L	0.006	0.005		ND	ND	ND
beta-BHC (s)	EPA 608	ug/L	0.006	0.005		NEG	NEG	NEG
delta-BHC (f)	EPA 608	ug/L	0.002	0.006		ND	ND	ND
delta-BHC (s)	EPA 608	ug/L	0.002	0.006		NEG	NEG	NEG
Lindane (f)	EPA 608	ug/L	0.005	0.005		ND	ND	ND
Lindane (s)	EPA 608	ug/L	0.005	0.005		NEG	NEG	NEG
Chlordane (f)	EPA 608	ug/L	0.01	0.05		ND	ND	ND
Chlordane (s)	EPA 608	ug/L	0.01	0.05		NEG	NEG	NEG
4,4'-DDD (f)	EPA 608	ug/L	0.004	0.003		0.003	ND	ND
4,4'-DDD (s)	EPA 608	ug/L	0.004	0.003		POS	NEG	NEG
4,4'-DDE (f)	EPA 608	ug/L	0.005	0.006		ND	ND	ND
4,4'-DDE (s)	EPA 608	ug/L	0.005	0.006		NEG	NEG	NEG
4,4'-DDT (f)	EPA 608	ug/L	0.03	0.01		0.01	ND	ND
4,4'-DDT (s)	EPA 608	ug/L	0.03	0.01		POS	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit		Field #: / Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (f)										
Dieldrin (f)	EPA 608	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	0.006
Dieldrin (s)	EPA 608	ug/L	0.005	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 608	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 608	ug/L	0.01	0.036		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 608	ug/L	0.01	0.012		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 608	ug/L	0.01	0.012		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 608	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 608	ug/L	0.006	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 608	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	0.04	ND
Heptachlor (s)	EPA 608	ug/L	0.007	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 608	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 608	ug/L	0.006	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 608	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 608	ug/L	0.25	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit MDL (A)	Detection Limit MDL (t)	Field #: / Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (t)										
Dieldrin (f)	EPA 608	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 608	ug/L	0.005	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 608	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 608	ug/L	0.01	0.036		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 608	ug/L	0.01	0.012		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II (s)	EPA 608	ug/L	0.01	0.012		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 608	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 608	ug/L	0.006	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 608	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 608	ug/L	0.007	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 608	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 608	ug/L	0.006	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 608	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 608	ug/L	0.25	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit		Field #: Site :	SW-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (†)										
Dieldrin (f)	EPA 608	ug/L	0.005	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin (s)	EPA 608	ug/L	0.005	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan I (f)	EPA 608	ug/L	0.01	0.036		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I (s)	EPA 608	ug/L	0.01	0.036		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan II (f)	EPA 608	ug/L	0.01	0.012		ND	ND	ND	ND	0.004	ND	ND	ND	ND
Endosulfan II (s)	EPA 608	ug/L	0.01	0.012		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin (f)	EPA 608	ug/L	0.006	0.02		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin (s)	EPA 608	ug/L	0.006	0.02		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor (f)	EPA 608	ug/L	0.007	0.005		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor (s)	EPA 608	ug/L	0.007	0.005		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 608	ug/L	0.006	0.002		ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide (s)	EPA 608	ug/L	0.006	0.002		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Toxaphene (f)	EPA 608	ug/L	0.25	0.25		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene (s)	EPA 608	ug/L	0.25	0.25		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit		Field #: Site :	SW-8B EIGHT	TRIP BLANK ONE	TRIP BLANK SEVEN
Pesticides (cont.)	EPA 608	ug/L	MDL (A)	MDL (t)				
Dieldrin (f)	EPA 608	ug/L	0.005	0.002		ND	ND	ND
Dieldrin (s)	EPA 608	ug/L	0.005	0.002		NEG	NEG	NEG
Endosulfan I (f)	EPA 608	ug/L	0.01	0.036		ND	ND	ND
Endosulfan I (s)	EPA 608	ug/L	0.01	0.036		NEG	NEG	NEG
Endosulfan II (f)	EPA 608	ug/L	0.01	0.012		0.004	ND	ND
Endosulfan II (s)	EPA 608	ug/L	0.01	0.012		NEG	NEG	NEG
Endosulfan Sulfate (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND
Endosulfan Sulfate (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG
Endrin (f)	EPA 608	ug/L	0.006	0.02		ND	ND	ND
Endrin (s)	EPA 608	ug/L	0.006	0.02		NEG	NEG	NEG
Endrin Aldehyde (f)	EPA 608	ug/L	0.01	0.01		ND	ND	ND
Endrin Aldehyde (s)	EPA 608	ug/L	0.01	0.01		NEG	NEG	NEG
Heptachlor (f)	EPA 608	ug/L	0.007	0.005		ND	ND	ND
Heptachlor (s)	EPA 608	ug/L	0.007	0.005		NEG	NEG	NEG
Heptachlor Epoxide (f)	EPA 608	ug/L	0.006	0.002		ND	ND	ND
Heptachlor Epoxide (s)	EPA 608	ug/L	0.006	0.002		NEG	NEG	NEG
Toxaphene (f)	EPA 608	ug/L	0.25	0.25		ND	ND	ND
Toxaphene (s)	EPA 608	ug/L	0.25	0.25		NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Pesticides (cont.)	EPA 608	uq/L	MDL										
Arochlor 1016 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Pesticides (cont.)	EPA 608	ug/L	MDL										
Arochlor 1016 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

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DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SW-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Pesticides (cont.)	EPA 608	ug/L	MDL										
Arochlor 1016 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1016 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1221 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1221 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1232 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1232 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1242 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1242 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1248 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1248 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1254 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1254 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Arochlor 1260 (f)	EPA 608	ug/L	0.09		ND	ND	ND	ND	ND	ND	ND	ND	ND
Arochlor 1260 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	SW-8B EIGHT	TRIP BLANK ONE	TRIP BLANK SEVEN
Pesticides (cont.)	EPA 608	ug/L	MDL				
Arochlor 1016 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1016 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1221 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1221 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1232 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1232 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1242 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1242 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1248 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1248 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1254 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1254 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG
Arochlor 1260 (f)	EPA 608	ug/L	0.09		ND	ND	ND
Arochlor 1260 (s)	EPA 608	ug/L	0.09		NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: Site :	GW1-A ONE	GW1-C ONE	GW1-D ONE	GW1-E ONE	SW-1A ONE	SW-1B ONE	GW3-A THREE	GW3-B THREE	GW3-C THREE
Herbicides	EPA 615	ug/L	MDL										
2,4,5-T (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

____ ind ____s th____e pi ter 10t ted.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	GW3-D THREE	SW-3A THREE	SW-3B THREE	SW-3C THREE	GW5-A FIVE	GW5-B FIVE	GW5-C FIVE	SW-5A FIVE	SW-5B FIVE
Herbicides	EPA 615	ug/L	MDL										
2,4,5-T (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-D (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

"ND" indicates that the parameter was not detected.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Detection Limit	Field #: / Site :	SW-5C FIVE	GW7-A SEVEN	GW7-B SEVEN	GW7-C SEVEN	SW-7A SEVEN	GW8-A EIGHT	GW8-B EIGHT	GW8-C EIGHT	SW-8A EIGHT
Herbicides	EPA 615	ug/L	MDL										
2,4,5-T (f)	EPA 615	ug/L	0.08		ND	0.08	ND	ND	ND	ND	ND	ND	ND
2,4,5-T (s)	EPA 615	ug/L	0.08		NEG	POS	NEG	NEG	NEG	NEG	NEG	NEG	NEG
2,4-D (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	0.09	ND	ND	ND
2,4-D (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
Silvex (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND	ND	ND	ND	ND	ND
Silvex (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG

[illegible] ind[illegible]s th[illegible] the p[illegible]ter [illegible]not [illegible]ted.

DATACHEM ANALYTICAL REPORT
Duluth IAP - Water Samples
Second Column Confirmations

Parameter	Method	Units	Limit	Field #: Site :	SW-8B EIGHT	TRIP BLANK ONE	TRIP BLNAK THREE	TRIP BLANK EIGHT
Herbicides	EPA 615	ug/L	MDL					
2,4,5-T (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND
2,4,5-T (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG
2,4-D (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND
2,4-D (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG
Silvex (f)	EPA 615	ug/L	0.08		ND	ND	ND	ND
Silvex (s)	EPA 615	ug/L	0.08		NEG	NEG	NEG	NEG

"ND" Indicates that the parameter was not detected.

APPENDIX I

CORRESPONDENCE WITH REGULATORY AGENCIES

LOCATION OF WELL | STATE OF MINNESOTA | WATER WELL RECORD | Minnesota Statutes 156A.01-.06 | MINNESOTA UNIQUE WELL NO. 194748

County Name: St. Louis

Township Name: | Township Number: 50 | Range Number: 15 | Section No.: 2 | Fraction: SE SW NE

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." | Sketch map of well location: Bunker; GW10B

Addition Name | Block Number | Lot Number

3. PROPERTY OWNER'S NAME: Air Natn'l Guard
Address: Duluth, MN 55811

4. WELL DEPTH (completed): 13.0 ft. | Date of Completion: 12/11/86

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug ☐ Hollow rod ☐ Air ☐ Bored ☐ Rotary ☐ Jetted ☒ Power Auger

6. USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☒ Test Well ☐ Air Conditioning

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silt	orange-brown	soft	0	7.5
Silty Gravelly Sand	brown	hard	7.5	13
Bedrock			13	

Use a second sheet, if needed

7. CASING: ☐ Black ☒ Threaded ☐ Galv. ☐ Welded ☐ Plastic ☒ S. Steel | HEIGHT: above/below Surface 2.07 ft. | Drive Shoe? Yes ☐ No ☒
2 in. to 3 ft. Weight ___ lbs./ft. | HOLE DIAM. 3 in. to 13 ft.

8. SCREEN: Make ___ | Type: Stainless Steel | Dia. 2 inch | Slot/Gauze 0.01 | Length 10.0 ft | Set between 13 ft. and 3 ft. | FITTINGS:

9. STATIC WATER LEVEL: 4.51 ft. ☒ below ☐ above land surface | Date Measured 1/2/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: ☐ Pitless adapter, manufacturer ___ model ___ ☐ Basement offset ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No
☒ Neat Cement CAP ☒ Bentonite ☐
Grout material: bentonite from 3 to 2 ft. Cu Yds.
neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: N 30 feet S direction ~~[illegible]~~ unknown 5.7e10 type
Well disinfected upon completion? Yes ☐ No ☒

14. PUMP: Date Installed ___ ☒ Not Installed
Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.: Split Spoon Samples Taken

16. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Licensee Business Name ___ License No. ___
Address ___
Signed ___ Authorized Representative ___ Date ___
Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY | 194748

HE-01000-01

194749

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

for Water Sample

1. LOCATION OF WELL

County Name: St Lois

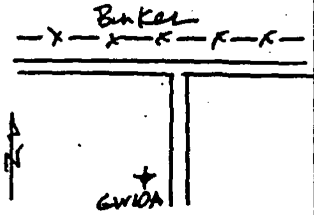
Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	2	SE ¼ SW ¼ NE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." — N, S, E, W — 1 mile — ½ mi.

Addition Name / Block Number / Lot Number

Sketch map of well location.



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Peat	dark brown	soft	0	7
Clayey Sandy Silt	brown	soft	7	20

Use a second sheet, if needed

3. PROPERTY OWNER'S NAME

Air Natl Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 200 ft. — Date of Completion: 12/11/86

5. 1 Cable tool, 2 Hollow rod, 3 Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 ☒ Power Auger, 10 Dug, 11

6. USE

1 Domestic, 2 Irrigation, 3 ☒ Test Well, 4 Public Supply, 5 Municipal, 6 Air Conditioning, 7 Industry, 8 Commercial, 9

7. CASING — HEIGHT: (Above)/Below

1 Black, 2 Galv., 3 Plastic, 4 ☒ Threaded, 5 Welded, 6 ☒ Steel

Surface 3.16 ft. — Drive Shoe? Yes ___ No ✗

2 in. to 9.5 ft. Weight ___ lbs./ft.

HOLE DIAM: ~8 in. to 20 ft.

8. SCREEN — Or open hole from ___ ft. to ___ ft.

Make ___

Type: Stainless Steel — Dia. 2 inch

Slot/Gauze: 0.01 — Length 10 ft — FITTINGS:

Set between 19.5 ft. and 9.5 ft.

9. STATIC WATER LEVEL 4.84 ft. ☒ below land surface ☐ above — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION

1 Pitless adapter, manufacturer ___ model ___

2 Basement offset — 3 At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1 ☒ Neat Cement cap — 2 ☒ Bentonite — 3

Grout material	from	to	ft. Cu. Yds.
bentonite	7.5	5.5	
cem-bent.	5.5	2.0	
neat cmt	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~200 feet — N direction — unknown site 10 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date Installed ___ ☒ Not Installed

Manufacturer's Name ___

Model Number ___ HP ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: 1 Submersible, 2 L.S. Turbine, 3 Reciprocating, 4 Jet, 5 Centrifugal, 6

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples Taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Date ___
Authorized Representative

___ Date ___
Name of Driller

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194749

HE-01508-01

WATER WELL RECORD

Minnesota Statutes 156A.01-.08

MINNESOTA UNIQUE WELL NO. for Water Sample: 194750

1. LOCATION OF WELL

County Name: St. Lois

Township Name: — Township Number: 50 N — Range Number: 15 W — Section No.: 2 — Fraction: SE SW SE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N / W / E / S; 1/2 mi.; 1 mile)

Addition Name — Block Number — Lot Number

Sketch map of well location.: Old DPDO Storage; 6W8C; Washington St; Parking

2. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

3. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Fill Gravel	tan	Med.	0	2
Peat	brown	Soft	2	7
Clayey Gravelly Silt	brown	Med	7	18

Use a second sheet, if needed

4. WELL DEPTH (completed): 18.0 ft. — Date of Completion: 12/7/86

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug ☐ Hollow rod ☐ Air ☐ Bored ☐ ______ ☐ Rotary ☐ Jetted ☒ Power Auger

6. USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☒ Test Well ☐ Air Conditioning ☐ ______

7. CASING — ☐ Black ☒ Threaded — HEIGHT: Above/Below Surface 2.75 ft. — ☐ Galv. ☐ Welded — ☐ Plastic ☒ S. Steel — Drive Shoe? Yes __ No X

2 in. to 8 ft. Weight ______ lbs./ft. — HOLE DIAM. 5 1/4 in. to 18 ft.

8. SCREEN — Make: ______ — Type: Stainless Steel — Dia.: 2 in. — Slot/Gauze: 0.01 — Length: 10 ft — Set between 18 ft. and 8 ft. — FITTINGS:

Or open hole from ______ ft. to ______ ft.

9. STATIC WATER LEVEL: 6.3 ft. ☒ below land surface ☐ above — Date Measured: 1/12/87

10. PUMPING LEVEL (below land surface): ______ ft. after ______ hrs. pumping ______ g.p.m.

11. WELL HEAD COMPLETION: ☐ Pitless adapter, manufacturer ______ model ______ ☐ Basement offset ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No — ☒ Neat Cement CAP ☒ Bentonite ☐ ______

Grout material: bentonite from 6 to 4 ft. Cu. Yds.; Cem.-bent. 4 to 2; Neat Cem 2 to 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~100 feet SSE direction Unknown type Site 8

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP: Date Installed ______ ☒ Not Installed — Manufacturer's Name ______ — Model Number ______ HP ______ Volts ______ — Length of drop pipe ______ ft. capacity ______ g.p.m. — Material of drop pipe ______ — Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐ ______

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ______ License No. ______

Address ______

Signed ______ Authorized Representative — Date ______

Name of Driller ______ Date ______

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194750

HE-01505-01

WATER WELL RECORD — Minnesota Statutes 156A 01-.08 — for Water Sample — **194784**

County Name: St Louis

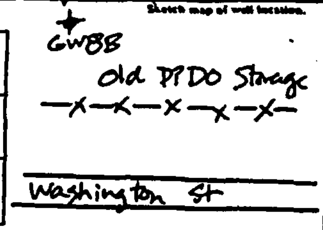
Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	NW SW SE

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N / S / E / W; 1 mile; ½ mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME: Air National Guard
Address: Duluth, MN 55811

4. WELL DEPTH (completed): 20.0 ft. Date of Completion: 12/6/86

5. Cable tool / Reverse / Driven / Dug / Hollow rod / Air / Bored / Rotary / Jetted / ☒ Power Auger

6. USE: Domestic / Public Supply / Industry / Irrigation / Municipal / Commercial / ☒ Test Well / Air Conditioning

7. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Sandy Clay	brown	Soft	0	8.5
Silty Gravely Sand	brown	Med.	8.5	20

Use a second sheet, if needed

7. CASING: Black / ☒ Threaded / Galv. / Welded / Plastic / SS. Steel
HEIGHT: Above/Below Surface 2.81 ft.
Drive Shoe? Yes ___ No X
2 in. to 10 ft. Weight ___ lbs./ft.
HOLE DIAM. 5.3 in. to 20 ft.

8. SCREEN: Make ___ Type Stainless Steel Dia. 2 in
Slot/Gauze 0.01 Length 10 ft
Set between 20 ft. and 10 ft.
Or open hole from ___ ft. to ___ ft.
FITTINGS:

9. STATIC WATER LEVEL: 3.8 ft. ☒ below land surface / above Date Measured 1/2/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: Pitless adapter, manufacturer ___ model ___ / Basement offset / At least 12" above grade

12. WELL GROUTED? ☒ Yes / No
☒ Neat Cement CAP / ☒ Bentonite
Grout material:

Material	from	to
bentonite	8	6
cem.-bent.	6	2
neat cement	2	0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~250 feet, S direction, unknown type, Site 8
Well disinfected upon completion? Yes / ☒ No

14. PUMP: Date installed ___ ☒ Not installed
Manufacturer's Name / Model Number / HP / Volts / Length of drop pipe / ft. capacity g.p.m. / Material of drop pipe
Type: Submersible / L.S. Turbine / Reciprocating / Jet / Centrifugal

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.
Split Spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Licensee Business Name ___ License No. ___
Address ___
Signed ___ Authorized Representative ___ Date ___
Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY 194784

HE-01205-01

STATE OF MINNESOTA — DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. 194785

for Water Sample

1. LOCATION OF WELL

County Name: St Lois

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	NE SW SE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

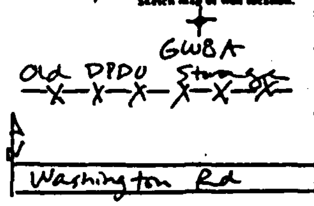
Show exact location of well in section grid with "X." (N, S, E, W; 1 mile; ½ mi.)

Addition Name:

Block Number:

Lot Number:

Sketch map of well location.



2. PROPERTY OWNER'S NAME

Air National Guard

Address: Duluth, MN 55811

3. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silt	brown	Soft	0	13

Use a second sheet, if needed

4. WELL DEPTH (completed) 13.0 ft. Date of Completion 12/6/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

7. CASING 1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded SS. Steel

HEIGHT: Above/Below Surface 1.74 ft.

Drive Shoe? Yes ___ No X

2 in. to 3 ft. Weight ___ lbs./ft.

HOLE DIAM. 8 in. to 13 ft.

8. SCREEN

Make ___

Type Stainless Steel Dia. 2 in.

Slot/Gauze 0.01 Length 10 ft

Set between 13 ft. and 3 ft.

FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 4.8 ft. ☒ below ☐ above land surface Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION

1☐ Pitless adapter, manufacturer ___ model ___

2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☐ Bentonite 3☐

Grout material bentonite from 3 to 2 ft. Cu. Yds.

Neat Cement 2 - 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~100 feet S direction Unknown Site 8 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date installed ___ ☒ Not installed

Manufacturer's Name ___

Model Number ___ HP ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: 1☐ Submersible 2☐ L.S. Turbine 3☐ Reciprocating 4☐ Jet 5☐ Centrifugal 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon sample taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194785

HE-01800-01

1. LOCATION OF WELL

County Name: St Louis

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

for Water Sample

194786

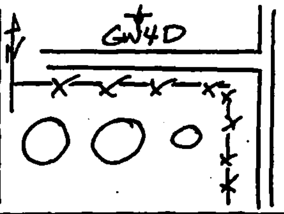
Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	2	NE SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X". (N, W, E, S; 1 mile; ½ mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth MN 55811

4. WELL DEPTH (completed): 25.0 ft. Date of Completion: 12/3/86

5. 1☐ Cable tool 4☐ Reverse 7☐ Driven 10☐ Dug
2☐ Hollow rod 5☐ Air 8☐ Bored 11☐ ______
3☐ Rotary 6☐ Jetted 9☒ Power Auger

6. USE
1☐ Domestic 4☐ Public Supply 7☐ Industry
2☐ Irrigation 5☐ Municipal 8☐ Commercial
3☒ Test Well 6☐ Air Conditioning 9☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Peat	dark brown	Soft	0	7.5
Silt	gray		7.5	12.5
Clay	tan	Med	12.5	19.5
Silty Sand	brown		19.5	25.0

Use a second sheet, if needed

7. CASING
1☐ Black ☒ Threaded HEIGHT: Above/Below Surface 2.55 ft.
2☐ Galv. 5☐ Welded
3☐ Plastic ☒ S. Steel Drive Shoe? Yes ___ No ☒
2 in. to 15 ft. Weight ___ lbs./ft.
___ in. to ___ ft. Weight ___ lbs./ft.
___ in. to ___ ft. Weight ___ lbs./ft.

HOLE DIAM.: ~23 in. to 25 ft.

8. SCREEN
Make ______ Or open hole from ___ ft. to ___ ft.
Type Stainless Steel Dia. 2 in
Slot/Gauze 0.01 Length 10
Set between 25 ft. and 15 ft. FITTINGS:
___ ft. and ___ ft.

9. STATIC WATER LEVEL
~~15~~ 7.3 ft. ☒ below land surface ☐ above Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)
___ ft. after ___ hrs. pumping ___ g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION
1☐ Pitless adapter, manufacturer ______ model ______
2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED?
☒ Yes ☐ No
1☒ Neat Cement CMP 2☒ Bentonite 3☐ ______
Grout material bentonite from 13 to 11 ft. Cu. Yds.
Cem.-bent. 11 2
Neat cemt 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION
~400 feet S direction APM unknown Site 4 type
Well disinfected upon completion? Yes ☐ No ☒

14. PUMP
Date Installed ______ ☒ Not installed
Manufacturer's Name ______
Model Number ______ HP ______ Volts ______
Length of drop pipe ______ ft. capacity ______ g.p.m.
Material of drop pipe ______
Type: 1☐ Submersible 2☐ L. S. Turbine 3☐ Reciprocating
4☐ Jet 5☐ Centrifugal 6☐ ______

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

______ Licensee Business Name ______ License No.

Address ______

Signed ______ Authorized Representative Date ______

______ Name of Driller Date ______

IMPORTANT: FILE WITH DEED — WELL OWNER COPY

194786

HE-01205-01

STATE OF MINNESOTA

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample 194787

1. LOCATION OF WELL

County Name: St Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	NE SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." — N, S, E, W, 1/2 mile, 1 mile

Sketch map of well location. Addition Name / Block Number / Lot Number

GW4C

3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 20.0 ft. — Date of Completion: 12/3/86

5. 1 Cable tool, 2 Hollow rod, 3 Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 [X] Power Auger, 10 Dug, 11 ______

6. USE: 1 Domestic, 2 Irrigation, 3 [X] Test Well, 4 Public Supply, 5 Municipal, 6 Air Conditioning, 7 Industry, 8 Commercial, 9 ______

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Fill Gravel, Silt	tan		0	.2
Sandy Clayey Silt	brown	soft	.2	12.5
Clay	brown	tough	12.5	20

Use a second sheet, if needed

7. CASING: 1 Black, 2 Galv., 3 Plastic, 4 [X] Threaded, 5 Welded, 6 [X] SS. Steel — HEIGHT: Above/Below Surface 2.7 ft. — Drive Shoe? Yes __ No X

2 in. to 10 ft. Weight ______ lbs./ft.

HOLE DIAM. 5.3 in. to 20 ft.

8. SCREEN

Make ______ Or open hole from ____ ft. to ____ ft.

Type: Stainless Steel — Dia. 2 in

Slot/Gauze: 0.01 — Length 10 ft

Set between 20 ft. and 10 ft. — FITTINGS:

9. STATIC WATER LEVEL: 8.5 ft. [X] below land surface ☐ above — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ____ ft. after ____ hrs. pumping ____ g.p.m.

11. WELL HEAD COMPLETION: 1 Pitless adapter, manufacturer ____ model ____; 2 Basement offset; 3 At least 12" above grade

12. WELL GROUTED? [X] Yes ☐ No

1 [X] Neat Cement CAP 2 [X] Bentonite 3 ☐

Grout material	from	to
bentonite	8	6
cem-bent	6	2
neat cement	2	0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~400 feet SSE direction, unknown Site 4 type

Well disinfected upon completion? Yes ☐ No X

14. PUMP: Date Installed ____ [X] Not Installed

Manufacturer's Name ____ Model Number ____ HP ____ Volts ____ Length of drop pipe ____ ft. capacity ____ g.p.m. Material of drop pipe ____

Type: 1 Submersible, 2 Jet, 3 L.S. Turbine, 4 Centrifugal, 5 Reciprocating, 6 ____

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ____ License No. ____

Address ____

Signed ____ Authorized Representative ____ Date ____

Name of Driller ____ Date ____

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194787

HE-01000-01

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

Minnesota Unique Number for Water Sample: 194788

1. LOCATION OF WELL

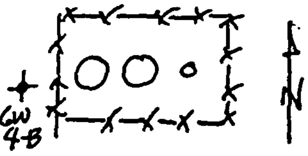
County Name: St Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	NE SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." — Sketch map of well location.

Addition Name / Block Number / Lot Number



3. PROPERTY OWNER'S NAME

Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 20.0 ft. Date of Completion 12/3/86

5. 1 Cable tool 2 Hollow rod 3 Rotary 4 Reverse 5 Air 6 Jetted 7 Driven 8 Bored 9 [X] Power Auger 10 Dug 11 ______

6. USE 1 Domestic 2 Irrigation 3 [X] Test Well 4 Public Supply 5 Municipal 6 Air Conditioning 7 Industry 8 Commercial 9 ______

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Peat, with clay	dark brown	Soft	0	6
Clay	gray brown	Soft	6	6.2
fine Silty Sandy	brown	Soft	6.2	12.5
Clayey sandy Silt	brown	Soft	12.5	20

Use a second sheet, if needed

7. CASING 1 Black 2 Galv. 3 Plastic 4 [X] Threaded 5 Welded 6 [X] S. Steel

Height: Above/Below Surface 2.42 ft. Drive Shoe? Yes ___ No X

2 in. to 5 ft. Weight ___ lbs./ft.

HOLE DIAM. 5 in. to 20 ft.

8. SCREEN Or open hole from ___ ft. to ___ ft.

Make ______

Type Stainless Steel Dia. 2 in

Slot/Gauze 0.01 Length 15 ft

Set between 20 ft. and 5 ft. FITTINGS:

9. STATIC WATER LEVEL 3.0 ft. [X] below land surface [ ] above Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION

1 Pitless adapter, manufacturer ______ model ______

2 Basement offset 3 At least 12" above grade

12. WELL GROUTED? [X] Yes [ ] No

1 [X] Neat Cement CAP 2 [X] Bentonite 3 ______

Grout material: bentonite from 4 to 2 ft. Cu. Yds.

neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~250 feet E direction unknown Site 4 type

Well disinfected upon completion? Yes [ ] No [X]

14. PUMP

Date Installed ______ [X] Not Installed

Manufacturer's Name ______

Model Number ______ HP ______ Volts ______

Length of drop pipe ______ ft. capacity ______ g.p.m.

Material of drop pipe ______

Type: 1 Submersible 2 L.S. Turbine 3 Reciprocating 4 Jet 5 Centrifugal 6 ______

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

______ Licensee Business Name ______ License No.

Address ______

Signed ______ Authorized Representative Date ______

______ Name of Driller Date ______

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194788

HE-01800-01

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

for Water Sample

194789

County Name: St. Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	SE SE SW

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

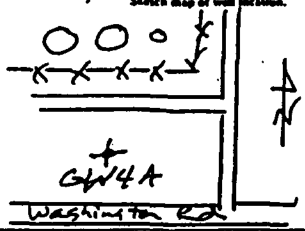
Show exact location of well in section grid with "X." N / W / E / S — 1 mile — ½ mi.

Addition Name

Block Number

Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 20.0 ft.

Date of Completion: 12/3/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE: 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

1. FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Fill & macadam	brown	soft	0	0.3
Clayey Silt - Peat	brown	soft	0.3	3.5
Silty Sand	brown	soft	3.5	9.5
Silty Sandy Clay	gray	soft	9.5	11.5
Clayey Silt	brown	soft	11.5	20

Use a second sheet, if needed

7. CASING: 1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded 6☒ S. steel

HEIGHT: Above/Below Surface 2.59 ft.

Drive Shoe? Yes ___ No X

2 in. to 5 ft. Weight ___ lbs./ft.

HOLE DIAM. 5.3 in. to 20 ft.

8. SCREEN

Make ___

Type: Stainless Steel Dia. 2 in

Slot/Gauze 0.01 Length 15 ft

Set between 20 ft. and 5 ft.

Or open hole from ___ ft. to ___ ft.

FITTINGS:

9. STATIC WATER LEVEL: 2.8 ft. ☒ below ☐ above land surface — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION

1☐ Pitless adapter, manufacturer ___ model ___

2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement Cap 2☒ Bentonite 3☐

Grout material	from	to	ft. Cu. Yds.
bentonite	4	2	
~~neat~~ cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~1000 feet N direction — type: unknown Site 4

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date installed ___ ☒ Not installed

Manufacturer's Name ___

Model Number ___ HP ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: 1☐ Submersible 2☐ Jet 3☐ L. S. Turbine 4☐ Centrifugal 5☐ Reciprocating 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194789

HE-01205-01

WATER WELL RECORD for Water Sample

Minnesota Statutes 156A.01-.08

194790

1. LOCATION OF WELL

County Name: St Lois

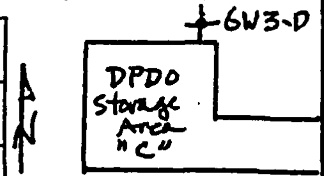
Township Name	Township Number	Range Number	Section No.	Fraction
	50	15 W	2	SW SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N, S, E, W; 1 mile; 1/2 mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 18.9 ft. Date of Completion 12/2/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Sandy Clayey Silt	brown	soft	0	6
Clay	black	soft	6	6.5
Silty Clayey Sand	brown	soft	6.5	~15
Sandy Silty Clay	brown	soft	15	~15.2
Silty Clayed Sand	brown	soft	15.2	18.5

Use a second sheet, if needed

7. CASING HEIGHT: Above/Below Surface 1.36 ft.

1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded 6☒ S. Steel Drive Shoe? Yes __ No X

2 in. to 3.9 ft. Weight __ lbs./ft.

__ in. to __ ft. Weight __ lbs./ft.

__ in. to __ ft. Weight __ lbs./ft.

HOLE DIAM. ~5.3 in. to 19 ft.; __ in. to __ ft.; __ in. to __ ft.

8. SCREEN Make __ Or open hole from __ ft. to __ ft.

Type Stainless Steel Dia. 2 in

Slot/Gauze 0.01 Length 15 ft

Set between 18.9 ft. and 3.9 ft. FITTINGS:

__ ft. and __ ft.

9. STATIC WATER LEVEL 4.02 ft. ☒ below ☐ above land surface Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

__ ft. after __ hrs. pumping __ g.p.m.

__ ft. after __ hrs. pumping __ g.p.m.

11. WELL HEAD COMPLETION 1☐ Pitless adapter, manufacturer __ model __ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☐ Bentonite 3☐

Grout material bentonite from 3.5 to 2.0 ft. Cu. Yds.

neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~10 feet SW direction ~~[illegible]~~ unknown sites type

Well disinfected upon completion? Yes☐ No☒

14. PUMP Date installed __ ☒ Not installed

Manufacturer's Name __

Model Number __ HP __ Volts __

Length of drop pipe __ ft. capacity __ g.p.m.

Material of drop pipe __

Type: 1☐ Submersible 2☐ L.S. Turbine 3☐ Reciprocating 4☐ Jet 5☐ Centrifugal 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

__ Licensee Business Name __ License No.

Address __

Signed __ Authorized Representative Date __

__ Name of Driller Date __

IMPORTANT:
FILE WITH DEED—WELL OWNER COPY

194790

HE-01205-01

WATER WELL RECORD

Minnesota Statutes 156A.01-.08

for Water Sample

194791

1. LOCATION OF WELL

County Name: St Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	2	SW SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." / Sketch map of well location.

Addition Name / Block Number / Lot Number

DPPO Storage Area "C"

GW3-C

3. PROPERTY OWNER'S NAME

Address: Air National Guard, Duluth, MN 55811

4. WELL DEPTH (completed): 19.0 ft. Date of Completion: 12/1/86

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug ☐ Hollow rod ☐ Air ☐ Bored ☐ Rotary ☐ Jetted ☒ Power Auger

6. USE ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☒ Test Well ☐ Air Conditioning ☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silt	brown	Soft	0	5
Silty ~~Sandy~~ Clay	brown	Soft	5	15
Silty Clayey Sand	brown	Soft	5	19

Use a second sheet, if needed

7. CASING: ☐ Black ☒ Threaded ☐ Galv. ☐ Welded ☐ Plastic ☒ S. Steel. HEIGHT: Above/Below Surface 1.62 ft. Drive Shoe? Yes ___ No ☒

2 in. to 9 ft. Weight ___ lbs./ft. HOLE DIAM. 5.3 in. to 19 ft.

8. SCREEN Make ___ Type Stainless Steel Dia. 2 in. Slot/Gauze ___ Length 10.0 Set between 19.0 ft. and 9.0 ft. FITTINGS:

9. STATIC WATER LEVEL 4.3 ft. ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION ☐ Pitless adapter, manufacturer ___ model ___ ☐ Basement offset ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No ☒ Neat Cement CAP ☒ Bentonite ☐

Grout material: bentonite from 7 to 5 ft.; cem.-bent. 5 to 2; neat cement 2 to 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~15 feet E direction, unknown Site 3 type. Well disinfected upon completion? Yes ☐ No ☒

14. PUMP Date installed ___ ☒ Not installed. Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___ Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY

194791

HE-01500-01

WATER WELL RECORD	Minnesota Statutes 156A.01-.06	for Water Sample	194792

1. LOCATION OF WELL

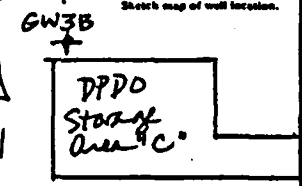
County Name				
St Louis				
Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	2	SW SE SW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N, W, E, S; 1 mile; ½ mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME
Air National Guard
Address: Duluth, MN 55811

4. WELL DEPTH (completed) 20.0 ft. Date of Completion 12/1/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	brown	Soft	0	11
Clay	green-tan	Soft	11	12.5
Gravely Sand	brown	Soft	12.5	20

Use a second sheet, if needed

7. CASING HEIGHT: Above/Below Surface 2.33 ft.
1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded 6☒ S.Steel
Drive Shoe? Yes ___ No X
2 in. to 5.0 ft. Weight ___ lbs./ft.
HOLE DIAM. ~5B in. to 20 ft.

8. SCREEN
Make ___
Type Stainless Steel Dia. 2 in
Slot/Gauze 0.01 Length 15.0
Set between 20.0 ft. and 5.0 ft.
FITTINGS:
Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 5.63 ft. ☒ below land surface ☐ above Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)
___ ft. after ___ hrs. pumping ___ g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION
1☐ Pitless adapter, manufacturer ___ model ___
2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No
1☒ Neat Cement cap 2☒ Bentonite 3☐
Grout material bentonite from 4 to 2 ft. Cu. Yds.
neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION
~10 feet SE direction ~~[illegible]~~ unknown Site 3 type
Well disinfected upon completion? Yes ☐ No ☒

14. PUMP
Date Installed ___ ☒ Not installed
Manufacturer's Name ___
Model Number ___ HP ___ Volts ___
Length of drop pipe ___ ft. capacity ___ g.p.m.
Material of drop pipe ___
Type: 1☐ Submersible 2☐ L.S. Turbine 3☐ Reciprocating 4☐ Air 5☐ Centrifugal 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.
Split Spoon samples collected

16. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

___ Licensee Business Name ___ License No.
Address ___
Signed ___ Authorized Representative Date ___
___ Name of Driller Date ___

IMPORTANT:
FILE WITH DEED—WELL OWNER COPY 194792

HE-01808-01

STATE OF MINNESOTA DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample **194793**

1. LOCATION OF WELL

County Name: St. Louis

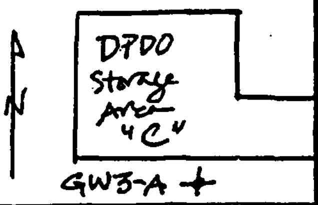
Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	SW SE SW

Distance and Directions from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N / W / E / S; 1 mile; ½ mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME

Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 17.0 ft. Date of Completion 11/26/86

5. 1 ☐ Cable tool 2 ☐ Hollow rod 3 ☐ Rotary 4 ☐ Reverse 5 ☐ Air 6 ☐ Jetted 7 ☐ Driven 8 ☐ Bored 9 ☒ Power Auger 10 ☐ Dug 11 ☐

6. USE 1 ☐ Domestic 2 ☐ Irrigation 3 ☒ Test Well 4 ☐ Public Supply 5 ☐ Municipal 6 ☐ Air Conditioning 7 ☐ Industry 8 ☐ Commercial 9 ☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Sandy Clay	brown	soft	0	9
Clayey Sandy Silt	brown	soft	9	13
Silty Sand	brown	soft	13	17

Use a second sheet, if needed

7. CASING 1 ☐ Black 2 ☐ Galv. 3 ☐ Plastic ☒ Threaded ☐ Welded SS Steel

HEIGHT: Above/Below Surface 2.59 ft. Drive Shoe? Yes ___ No X

2 in. to 6.5 ft. Weight ___ lbs./ft. HOLE DIAM. 5.3 in. to 17 ft.

8. SCREEN Make ___ Type Stainless Steel Dia. 2 in. Slot/Gauze 0.01 Length 10.0 Set between 16.5 ft. and 6.5 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 7.6 ft. ☒ below ☐ above land surface Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION 1 ☐ Pitless adapter, manufacturer ___ model ___ 2 ☐ Basement offset 3 ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1 ☒ Neat Cement CAP 2 ☒ Bentonite 3 ☐

Grout material: bentonite from 5 to 3 ft. Cu. Yds.

neat cement 3 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~30 feet NW direction ~~unknown~~ unknown Site 3 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP Date installed ___ ☒ Not installed

Manufacturer's Name ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: 1 ☐ Submersible 2 ☐ Jet 3 ☐ L. S. Turbine 4 ☐ Centrifugal 5 ☐ Reciprocating 6 ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY **194793**

HE-01205-01

STATE OF MINNESOTA

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample: 194794

1. LOCATION OF WELL

County Name: St Louis

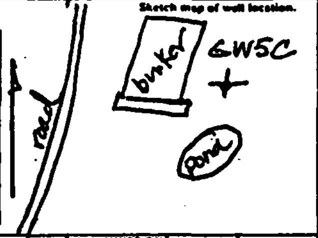
Township Name	Township Number	Range Number	Section No.	Fraction
	51 N	15 W	36	SW NW SE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." (N, S, E, W; 1 mile; ½ mi.)

Addition Name / Block Number / Lot Number

Sketch map of well location.



2. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 20.0 ft. Date of Completion: 11/22/86

5. 1 ☐ Cable tool 2 ☐ Hollow rod 3 ☐ Rotary 4 ☐ Reverse 5 ☐ Air 6 ☐ Jetted 7 ☐ Driven 8 ☐ Bored 9 ☒ Power Auger 10 ☐ Dug 11 ☐ ____

6. USE: 1 ☐ Domestic 2 ☐ Irrigation 3 ☒ Test Well 4 ☐ Public Supply 5 ☐ Municipal 6 ☐ Air Conditioning 7 ☐ Industry 8 ☐ Commercial 9 ☐

7. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Sand	brown	soft	0	6
Clayey Silt	red-brown	soft	6	10
Sandy Clayey Silt	brown	soft	10	20

Use a second sheet, if needed

7. CASING: 1 ☐ Black 2 ☐ Galv. 3 ☐ Plastic ☒ Threaded 5 ☐ Welded SS Steel

HEIGHT: Above/Below Surface 2.81 ft. Drive Shoe? Yes ___ No X

2 in. to 5 ft. Weight ___ lbs./ft.

HOLE DIAM: 2.3 in. to 20 ft.

8. SCREEN: Make ___ Type: Stainless Steel Dia. 2 in Slot/Gauze 0.01 Length 15 ft Set between 20 ft. and 5 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 5.45 ft. ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1 ☐ Pitless adapter, manufacturer ___ model ___ 2 ☐ Basement offset 3 ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

☒ Neat Cement CAP ☒ Bentonite 3 ☐

Grout material	from	to	ft. Cu. Yds.
bentonite	4	2	
neat cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~35 feet SSE direction ~~[illegible]~~ unknown Site 5 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP: Date installed ___ ☒ Not installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___

Type: 1 ☐ Submersible 2 ☐ L.S. Turbine 3 ☐ Reciprocating 4 ☐ Jet 5 ☐ Centrifugal 6 ☐ ___

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194794

HE-01205-01

1. LOCATION OF WELL

County Name: St Lois

WATER WELL RECORD

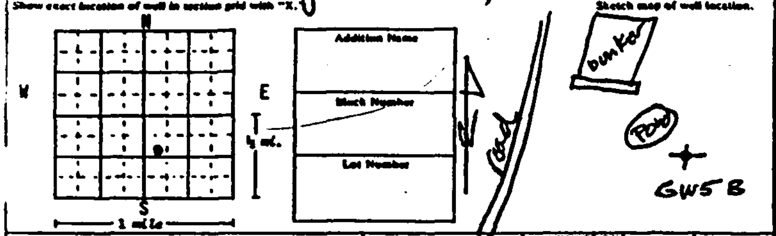
Minnesota Statutes 156A.01-.08

MINNESOTA UNIQUE WELL NO. for Water Sample: 194795

Township Name	Township Number	Range Number	Section No.	Fraction
	51	15	36	SW ¼ NW ¼ SE ¼

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." / Sketch map of well location.



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Gravely Sand	brown	soft	0	3.5
Sandy Clayey Silt	brown	soft	3.5	8
Silty Sand	brown	soft	8	13
Gravely Sand	brown	med	13	16

Use a second sheet, if needed

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples taken.

3. PROPERTY OWNER'S NAME

Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 16.0 ft. Date of Completion 11/21/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐ ______

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

7. CASING 1☐ Black 2☐ Galv. 3☐ Plastic ☒ Threaded ☐ Welded SS Steel — HEIGHT: above/below Surface 2.8 ft. Drive Shoe? Yes ___ No X

2 in. to 4.8 ft. Weight ___ lbs./ft. — HOLE DIAM. 6.3 in. to 16 ft.

8. SCREEN Make ______ Type Stainless Steel Dia. 2 in — Slot/Gauze 0.01 Length 10 ft — Set between 14.8 ft. and 4.8 ft. — FITTINGS: — Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 5.63 ft. ☒ below land surface ☐ above — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m. / ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION 1☐ Pitless adapter, manufacturer ______ model ______ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No — ☒ Neat Cement CAP ☒ Bentonite 3☐

Grout material	from	to	ft. Cu. Yds.
bentonite	3.9	1.9	
neat cement	1.9	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~100 feet W direction ~~unknown~~ unknown Site 5 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP Date installed ______ ☒ Not installed — Manufacturer's Name ______ Model Number ______ HP ______ Volts ______ Length of drop pipe ______ ft. capacity ______ g.p.m. — Material of drop pipe ______ — Type: 1☐ Submersible 2☐ L. S. Turbine 3☐ Reciprocating 4☐ Jet 5☐ Centrifugal 6☐ ______

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

______ Licensee Business Name ______ License No.

Address ______

Signed ______ Authorized Representative Date ______

______ Name of Driller Date ______

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194795

HE-01205-01

STATE OF MINNESOTA — DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.08

MINNESOTA UNIQUE WELL NO. for Water Sample: **194796**

1. LOCATION OF WELL

County Name: St. Louis

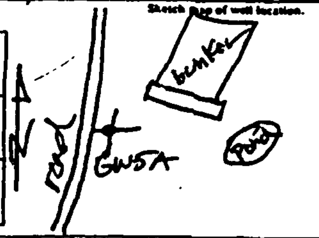
Township Name	Township Number	Range Number	Section No.	Fraction
	51 N	15 W	36	SW NW SE

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X."

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 22.0 ft. Date of Completion: 11/21/86

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug ☐ Hollow rod ☐ Air ☐ Bored ☐ Rotary ☐ Jetted ☒ Power Auger

6. USE ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☒ Test Well ☐ Air Conditioning ☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silty Sand	brown	soft	0	10.5
Silty Sand	brown	soft	10.5	12
Gravely Silty Sand	brown	soft	12	18.5
Silty Sand	brown	soft	18.5	22

Use a second sheet, if needed

7. CASING ☐ Black ☒ Threaded ☐ Galv. ☐ Welded ☐ Plastic — S.S. Steel

HEIGHT: Above/Below Surface 2.48 ft. Drive Shoe? Yes ___ No X

2 in. to 7 ft. Weight ___ lbs./ft.

HOLE DIAM. 5.3 in. to 22 ft.

8. SCREEN Make ___ Type Stainless Steel Dia. 2 in. Slot/Gauze 0.01 Length 15 ft. Set between 22 ft. and 7 ft.

Or open hole from ___ ft. to ___ ft.

FITTINGS:

9. STATIC WATER LEVEL: 6.4 ft. ☒ below ☐ above land surface. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION ☐ Pitless adapter, manufacturer ___ model ___ ☐ Basement offset ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

☒ Neat Cement CAP ☒ Bentonite ☐

Grout material: bentonite from 4.1 to 1.9 ft. Cu. Yds.

neat cement 1.9 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: N 200 feet E direction ~~unknown~~ unknown Site 5 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP Date installed ___ ☒ Not installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___

Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY **194796**

HE-01205-01

STATE OF MINNESOTA — DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A 01-.08

MINNESOTA UNIQUE WELL NO. for Water Sample: **194797**

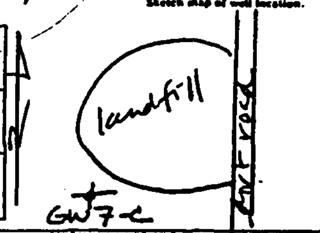
1. LOCATION OF WELL

County Name: St Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	1	SE NW NW

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X". Sketch map of well location.



Addition Name / Block Number / Lot Number

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clayey Sand	brown	soft	0	7
Gravely Sand	red-brown	soft	7	13
Silty Sand	brown	soft	13	15

Use a second sheet, if needed

3. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 15.0 ft. Date of Completion: 11/24/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

7. CASING 1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded ☒ S. Steel

HEIGHT: Above/Below Surface 2.53 ft. Drive Shoe? Yes ___ No ☒

2 in. to 3.75 ft. Weight ___ lbs./ft.

HOLE DIAM: 5.3 in. to 15 ft.

8. SCREEN Make ___ Type: Stainless Steel Dia. 2" Slot/Gauze 0.01 Length 10 ft. Set between 13.75 ft. and 3.75 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 1.96 ft. ☒ below ☐ above land surface. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION 1☐ Pitless adapter, manufacturer ___ model ___ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☒ Bentonite 3☐

Grout material	from	to	ft. Cu. Yds.
bentonite	3	2	
neat cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~20 feet NE direction ~~[illegible]~~ Unknown Site 7 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP Date installed ___ ☒ Not installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___

Type: 1☐ Submersible 2☐ Jet 3☐ L.S. Turbine 4☐ Centrifugal 5☐ Reciprocating 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194797

HE-01205-01

STATE OF MINNESOTA — DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. (for Water Sample): 194798

1. LOCATION OF WELL

County Name: St. Louis

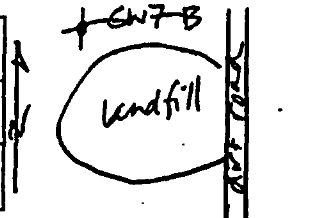
Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	1	SE NW NW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." N / W / E / S — 1 mile — ½ mi.

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME

Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 20.0 ft. — Date of Completion: 11/23/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐ ______

6. USE

1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

7. CASING

1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded 6☒ S. Steel

HEIGHT: Above/Below Surface 2.76 ft.

Drive Shoe? Yes ___ No X

2 in. to 4.8 ft. Weight ______ lbs./ft.

HOLE DIAM: 5.3 in. to 20 ft.

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silt	brown	Soft	0	1
Sandy Silt	red-orange	soft	1	3.5
Silty Gravely Sand	brown	soft	3.5	13
Gravely Sand	brown	soft	13	20

Use a second sheet, if needed

8. SCREEN

Make ______ Or open hole from ______ ft. to ______ ft.

Type: Stainless Steel Dia. 2 in

Slot/Gauze: 0.01 Length: 15 ft

Set between 19.8 ft. and 4.8 ft. FITTINGS:

9. STATIC WATER LEVEL

4.77 ft. ☒ below land surface ☐ above — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

______ ft. after ______ hrs. pumping ______ g.p.m.

11. WELL HEAD COMPLETION

1☐ Pitless adapter, manufacturer ______ model ______ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☒ Bentonite 3☐

Grout material: bentonite from 3 to 2 ft. Cu. Yds.

neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~75 feet S direction ~~landfill~~ unknown Site 7 type

Well disinfected upon completion? Yes☐ No☒

14. PUMP

Date Installed ______ ☒ Not Installed

Manufacturer's Name ______

Model Number ______ HP ______ Volts ______

Length of drop pipe ______ ft. capacity ______ g.p.m.

Material of drop pipe ______

Type: 1☐ Submersible 2☐ Jet 3☐ L. S. Turbine 4☐ Centrifugal 5☐ Reciprocating 6☐ ______

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples Taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ______ License No. ______

Address ______

Signed ______ Authorized Representative ______ Date ______

Name of Driller ______ Date ______

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194798

HE-01205-01

WATER WELL RECORD for Water Sample

Minnesota Statutes 156A.01-.08

194799

1. LOCATION OF WELL

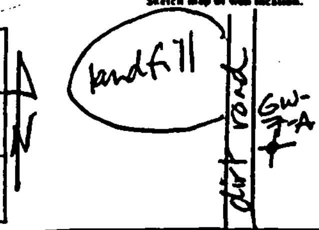
County Name: St. Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	1	NE ¼ SW ¼ NW ¼

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X". Sketch map of well location.

Addition Name
Block Number
Lot Number



2. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 19.0 ft. Date of Completion: 11/23/86

5. 1 ☐ Cable tool 2 ☐ Hollow rod 3 ☐ Rotary 4 ☐ Reverse 5 ☐ Air 6 ☐ Jetted 7 ☐ Driven 8 ☐ Bored 9 ☒ Power Auger 10 ☐ Dug 11 ☐ ______

6. USE: 1 ☐ Domestic 2 ☐ Irrigation 3 ☒ Test Well 4 ☐ Public Supply 5 ☐ Municipal 6 ☐ Air Conditioning 7 ☐ Industry 8 ☐ Commercial 9 ☐

7. CASING: 1 ☐ Black 2 ☐ Galv. 3 ☐ Plastic 4 ☒ Threaded 5 ☐ Welded 6 ☒ Steel

HEIGHT: Above/Below Surface 2.77 ft. Drive Shoe? Yes ___ No X

2 in. to 9 ft. Weight ______ lbs./ft.

HOLE DIAM.: 6.3 in. to 19 ft.

3. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clayey Silt	brown	soft	0	6
Gravely Sand	brown	soft	6	8
Silty Sand	brown	soft	8	19

Use a second sheet, if needed

8. SCREEN

Make ______ Type: Stainless Steel Dia. 2 in

Slot/Gauge: 0.01 Length: 10 ft

Set between 9 ft. and 9 ft. FITTINGS:

Or open hole from ______ ft. to ______ ft.

9. STATIC WATER LEVEL: 3.89 ft. ☒ below ☐ above land surface. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

______ ft. after ______ hrs. pumping ______ g.p.m.

______ ft. after ______ hrs. pumping ______ g.p.m.

11. WELL HEAD COMPLETION: 1 ☐ Pitless adapter, manufacturer ______ model ______ 2 ☐ Basement offset 3 ☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1 ☒ Neat Cement CAP 2 ☒ Bentonite 3 ☐

Grout material	from	to	ft. Cu. Yds.
bentonite	8	6	
cem.-bent	6	2	
neat cem	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~150 feet NW direction ~~landfill~~ Unknown Site 7 type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date Installed ______ ☒ Not installed

Manufacturer's Name ______

Model Number ______ HP ______ Volts ______

Length of drop pipe ______ ft. capacity ______ g.p.m.

Material of drop pipe ______

Type: 1 ☐ Submersible 2 ☐ Jet 3 ☐ L. S. Turbine 4 ☐ Centrifugal 5 ☐ Reciprocating 6 ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

______ Licensee Business Name ______ License No.

Address ______

Signed ______ Authorized Representative Date ______

______ Name of Driller Date ______

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194799

HE-01205-01

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

for Water Sample

194800

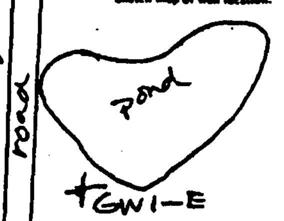
1. LOCATION OF WELL

County Name					
St. Louis					
Township Name	Township Number	Range Number	Section No.	Fraction	
	51	15	36	NW NW SE	

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X."

Sketch map of well location.



Addition Name

Block Number

Lot Number

3. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 25.0 ft. Date of Completion: 11/20/86

5. 1 Cable tool, 2 Hollow rod, 3 Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 Power Auger (X), 10 Dug, 11 ______

6. USE: 1 Domestic, 2 Irrigation, 3 Test Well (X), 4 Public Supply, 5 Municipal, 6 Air Conditioning, 7 Industry, 8 Commercial, 9 ______

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	brown	soft	0	2
Clayey Silt	red-brown	soft	2	13
Silty Gravely Clay	brown	soft	13	23
Silty Sand	green-brown	soft	23	25

Use a second sheet, if needed

7. CASING: 1 Black, 2 Galv., 3 Plastic; Threaded (X), Welded; HEIGHT: Above/below Surface 2.54 ft.; ss steel; Drive Shoe? Yes ___ No ___

2 in. to 9 ft. Weight ___ lbs./ft. HOLE DIAM. ~5.3 in. to 25 ft.

8. SCREEN: Make ______ Type: Stainless Steel Dia. 2 in; Slot/Gauze 0.01 Length 15.0; Set between 24 ft. and 9 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 16 ft. below land surface (X) / above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1 Pitless adapter, manufacturer ___ model ___; 2 Basement offset; 3 At least 12" above grade

12. WELL GROUTED? Yes (X) No; 1 Neat Cement (X) CAP; 2 Bentonite (X); 3 ___

Grout material	from	to	ft. Cu. Yds.
bentonite	8	6	
cem.-bent.	6	2	
neat cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~150 feet NW direction, unknown type; Goose Dump?

Well disinfected upon completion? Yes ___ No (X)

14. PUMP: Date Installed ______ Not installed (X)

Manufacturer's Name ______; Model Number ______ HP ___ Volts ___; Length of drop pipe ___ ft. capacity ___ g.p.m.; Material of drop pipe ______; Type: 1 Submersible, 2 Jet, 3 L.S. Turbine, 4 Centrifugal, 5 Reciprocating, 6 ______

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Samples Taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ______ License No. ______

Address ______

Signed ______ Authorized Representative Date ______

Name of Driller ______ Date ______

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194800

HE-01205-01

WATER WELL RECORD
Minnesota Statutes 156A.01-.06

194809

1. LOCATION OF WELL

County Name	Township Name	Township Number	Range Number	Section No.	Fraction
St Lovis		51	15	36	NW NW SE

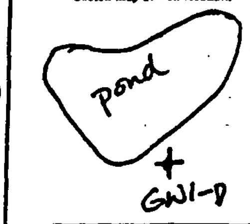
Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X."

N W E S — 1 mile — ½ mi.

Addition Name | Block Number | Lot Number

Sketch map of well location.



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	brown	Soft	0	3
Silty Gravely Clay	brown	Soft	3	16.6

Use a second sheet, if needed

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon Sampls Taken.

3. PROPERTY OWNER'S NAME: Tactical Air Command
Address: Duluth, MN 55811

4. WELL DEPTH (completed): 16.5 ft. Date of Completion: 11/20/86

5. 1☐ Cable tool 4☐ Reverse 7☐ Driven 10☐ Dug
2☐ Hollow rod 5☐ Air 8☐ Bored 11☐
3☐ Rotary 6☐ Jetted 9☒ Power Auger

6. USE
1☐ Domestic 4☐ Public Supply 7☐ Industry
2☐ Irrigation 5☐ Municipal 8☐ Commercial
3☒ Test Well 6☐ Air Conditioning 9☐

7. CASING — HEIGHT: Above/Below — HOLE DIAM.
1☐ Black 4☒ Threaded
2☐ Galv. 5☐ Welded — Surface 1.94 ft.
3☐ Plastic 6 S. Steel — Drive Shoe? Yes ___ No X — 5.3 in. to 16.5 ft.
2 in. to 6.5 ft. Weight ___ lbs./ft.
___ in. to ___ ft. Weight ___ lbs./ft.
___ in. to ___ ft. Weight ___ lbs./ft.

8. SCREEN — Or open hole from ___ ft. to ___ ft.
Make ___
Type Stainless Steel Dia. 2 in
Slot/Gauze 0.01 Length 10 ft
Set between 16.5 ft. and 6.5 ft. FITTINGS:
___ ft. and ___ ft.

9. STATIC WATER LEVEL: 13.22 ft. ☒ below ☐ above land surface — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)
___ ft. after ___ hrs. pumping ___ g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION
1☐ Pitless adapter, manufacturer ___ model ___
2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED?
☒ Yes ☐ No
1☒ Neat Cement CAP 2☒ Bentonite 3☐
Grout material: bentonite from 6 to 4 ft. Cu. Yds.
Cem-bent 4 2
Neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION
~300 feet NW direction unknown type / Grave Dump?
Well disinfected upon completion? Yes☐ No☒

14. PUMP
Date Installed ___ ☒ Not Installed
Manufacturer's Name ___
Model Number ___ HP ___ Volts ___
Length of drop pipe ___ ft. capacity ___ g.p.m.
Material of drop pipe ___
Type: 1☐ Submersible 2☐ L.S. Turbine 3☐ Reciprocating
4☐ Jet 5☐ Centrifugal 6☐

16. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Date ___
Authorized Representative

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194809

HE-01800-01

MINNESOTA UNIQUE WELL NO. 194810

WATER WELL RECORD

Minnesota Statutes 1564.01-.06

1. LOCATION OF WELL

County Name: St Louis

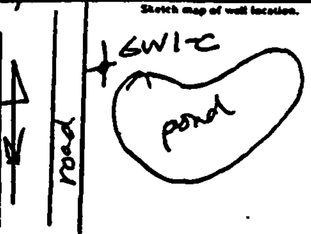
Township Number: 51 N | Range Number: 15 W | Section No.: 36 | Fraction: NW NW SE

Distance and Direction from Road Intersection or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." — N, S, E, W, 1 mile, ½ mi.

Addition Name | Block Number | Lot Number

Sketch map of well location.



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	brown	soft	0	3.5
Clayey Silt	brown	soft	3.5	9.5
Gravely Sand	brown	soft	9.5	13
Clayey Silt	brown	soft	13	17.5

Use a second sheet, if needed

3. PROPERTY OWNER'S NAME

Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 17.5 ft.

Date of Completion: 11/19/86

5. ☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug ☐ Hollow rod ☐ Air ☐ Bored ☐ ☐ Rotary ☐ Jetted ☒ Power Auger

6. USE

☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Municipal ☐ Commercial ☒ Test Well ☐ Air Conditioning ☐

7. CASING HEIGHT: 0 Above/Below

☐ Black ☒ Threaded ☐ Galv. ☐ Welded ☐ Plastic S.Steel — Surface 3.22 ft. — Drive Shoe? Yes ___ No X

2 in. to 7.5 ft. Weight ___ lbs./ft.

HOLE DIAM. ~5.3 in. to 17 ft.

8. SCREEN

Make ___

Type: Stainless Steel — Dia. 2 in

Slot/Gauze: 0.01 — Length 10 ft

Set between 17.5 ft. and 7.5 ft.

FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 4.32 ft. ☒ below ☐ above land surface — Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION

☐ Pitless adapter, manufacturer ___ model ___

☐ Basement offset ☐ At least 12" above grade

12. WELL GROUTED?

☒ Yes ☐ No

☒ Neat Cement CAP ☒ Bentonite ☐

Grout material: bentonite from 6.5 to 4.5 ft. Cu. Yds.

natl. cave. 4.5 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~100 feet SE direction unknown type

Well disinfected upon completion? Yes ☐ No ☒ Gonna Drop 1

14. PUMP

Date Installed ___ ☒ Not Installed

Manufacturer's Name ___

Model Number ___ HP ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: ☐ Submersible ☐ L. S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon sample taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY 194810

HE-01205-01

1. LOCATION OF WELL

County Name: St. Louis

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

for Water Sample

194811

Township Name	Township Number	Range Number	Section No.	Fraction
	5[illegible]1	15 W	36	WE "NW"SE"

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X". Sketch map of well location.

Addition Name / Block Number / Lot Number

2. PROPERTY OWNER'S NAME: Tactical Air Command

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 29.0 ft. Date of Completion: 11/18/86

5. 1 Cable tool 2 Hollow rod 3 Rotary 4 Reverse 5 Air 6 Jetted 7 Driven 8 Bored 9 [X] Power Auger 10 Dug 11

6. USE 1 Domestic 2 Irrigation 3 [X] Test Well 4 Public Supply 5 Municipal 6 Air Conditioning 7 Industry 8 Commercial 9

3. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	brown	soft	0	19
Silty Clayey Sand	brown	soft	19	22
Clayey Silt	brown	soft	22	29

Use a second sheet, if needed

7. CASING 1 Black 2 Galv. 3 Plastic [X] Threaded 5 Welded [X] SS Steel

HEIGHT: Above/Below Surface 2.47 ft.

Drive Shoe? Yes ___ No X

2 in. to 14 ft. Weight ___ lbs./ft.

HOLE DIAM. 5.3 in. to 29 ft.

8. SCREEN Make ___ Type Stainless Steel Dia. 2 in. Slot/Gauze 0.01 Length 15.0 ft. Set between 29 ft. and 14 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL 11.28 ft. [X] below land surface / above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION 1 Pitless adapter, manufacturer ___ model ___ 2 Basement offset 3 At least 12" above grade

12. WELL GROUTED? [X] Yes No

[X] Neat Cement CAP [X] Bentonite 3

Grout material	from	to	ft. Cu. Yds.
bentonite	13	11	
cem-bent.	11	2	
neat cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION ~250 feet SW direction unknown type

Well disinfected upon completion? Yes No [X] goose Day!

14. PUMP Date Installed ___ [X] Not Installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___ Type: 1 Submersible 2 Jet 3 L.S. Turbine 4 Centrifugal 5 Reciprocating 6

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED — WELL OWNER COPY

194811

HE-01809-01

STATE OF MINNESOTA DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample: 194812

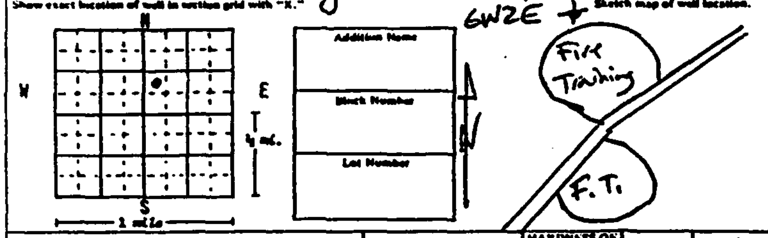
1. LOCATION OF WELL

County Name: St Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50	15	1	NW¼SW¼NE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X". Sketch map of well location.



3. PROPERTY OWNER'S NAME

Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed) 19.0 ft. Date of Completion 11/17/86

5. 1 Cable tool, 2 Hollow rod, 3 Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 ☒ Power Auger, 10 Dug, 11 ____

6. USE

1 Domestic, 2 Irrigation, 3 ☒ Test Well, 4 Public Supply, 5 Municipal, 6 Air Conditioning, 7 Industry, 8 Commercial, 9 ____

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clay, trace Gravel	brown	soft	0	12.5
Gravely Sand	red-brown	soft	12.5	19

Use a second sheet, if needed

7. CASING

1 Black, 2 Galv., 3 Plastic; ☒ Threaded, Welded; HEIGHT: Above/Below Surface 0.93 ft.; Drive Shoe? Yes ___ No ☒; HOLE DIAM.

SS Steel 2 in. to 9 ft. Weight ____ lbs./ft. ~6 in. to 19 ft.

8. SCREEN

Make ____

Type Stainless Steel Dia. 2 in.

Slot/Gauze 0.01 Length 10 ft

Set between 19 ft. and 9 ft.

Or open hole from ____ ft. to ____ ft.

FITTINGS:

9. STATIC WATER LEVEL

10.82 ft. ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface)

____ ft. after ____ hrs. pumping ____ g.p.m.

____ ft. after ____ hrs. pumping ____ g.p.m.

11. WELL HEAD COMPLETION

1 Pitless adapter, manufacturer ____ model ____

2 Basement offset 3 At least 12" above grade

12. WELL GROUTED?

☒ Yes ☐ No

1 ☒ Neat Cement CAP 2 ☒ Bentonite 3 ____

Grout material	from	to	ft. Cu. Yds.
bentonite	8	6	
cem-bent	6	2	
neat Cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION

~50 feet S direction unknown type Fire Training

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date Installed ____ ☒ Not Installed

Manufacturer's Name ____

Model Number ____ HP ____ Volts ____

Length of drop pipe ____ ft. capacity ____ g.p.m.

Material of drop pipe ____

Type: 1 Submersible, 2 L.S. Turbine, 3 Reciprocating, 4 Jet, 5 Centrifugal, 6 ____

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

____ Licensee Business Name ____ License No.

Address ____

Signed ____ Authorized Representative Date ____

____ Name of Driller Date ____

IMPORTANT: FILE WITH DEED—WELL OWNER COPY 194812

HE-01205-01

County Name: St Louis

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

For Water Sample

194813

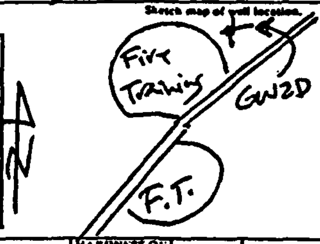
Township Name	Township Number	Range Number	Section No.	Fraction
	58 N	15 W	1	NW SW NE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." — N, S, E, W, 1 mile, ½ mi.

Addition Name / Block Number / Lot Number

Sketch map of well location.



3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 23.0 ft. Date of Completion: 11/17/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE: 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	red-brown	soft	0	11
Clayey Silty Sand	gray	soft	11	13.5
Silty Sand	brown	soft	13.5	20
Silty Clay	brown	soft	20	23

Use a second sheet, if needed

7. CASING: 1☐ Black 2☐ Galv. 3☐ Plastic ☒ Threaded ☐ Welded ☒ S Steel. HEIGHT: Above/Below Surface 1.77 ft. Drive Shoe? Yes ___ No ☒

2 in. to 7.5 ft. Weight ___ lbs./ft. HOLE DIAM. ~6 3 in. to 23 ft.

8. SCREEN: Make ___ Type Stainless Steel Dia. 2 in. Slot/Gauze 0.01 Length 15 ft. Set between 22.5 ft. and 7.5 ft. FITTINGS: Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 11.13 ft. ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1☐ Pitless adapter, manufacturer ___ model ___ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☒ Bentonite 3☐

Grout material	from	to	cu. yds.
bentonite	6.5	4.5	
cem-bent	4.5	2	
neat cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~100 feet S direction Unknown type Fire Training

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP: Date Installed ___ ☒ Not Installed. Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___ Type: 1☐ Submersible 2☐ Jet 3☐ L.S. Turbine 4☐ Centrifugal 5☐ Reciprocating 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED—WELL OWNER COPY 194813

HE-01305-01

MINNESOTA UNIQUE WELL NO. 194814

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

1. LOCATION OF WELL

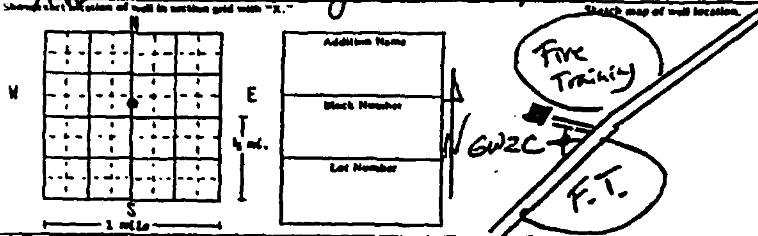
County Name: St Louis

Township Number: 50 N | Range Number: 15 W | Section No.: 1 | Fraction: SW SW NE

Distance and Direction from Road Intersection or Street Address and City of Well Location: ~~Air~~ National Guard Base, Duluth

Show exact location of well in section grid with "X". | Sketch map of well location.

Addition Name | Block Number | Lot Number



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	red-brown	soft	0	0.5
Clayey Silty Sand	red-brown	soft	0.5	1.0
Silty Clay	red-brown	soft	1.0	12
Silty Sand	red-brown	soft	12	18
Sandy Clayey Silt	brown	soft	18	21.5

Use a second sheet, if needed

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon sample taken

3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 21.5 ft. | Date of Completion: 11/14/86

5. 1 Cable tool | 2 Hollow rod | 3 Rotary | 4 Reverse | 5 Air | 6 Jetted | 7 Driven | 8 Bored | 9 [X] Power Auger | 10 Dug | 11 ______

6. USE: 1 Domestic | 2 Irrigation | 3 [X] Test Well | 4 Public Supply | 5 Municipal | 6 Air Conditioning | 7 Industry | 8 Commercial | 9 ______

7. CASING: 1 Black | 2 Galv. | 3 Plastic | [X] Threaded | 5 Welded | ~~ss~~ steel

HEIGHT: Above/Below Surface 2.38 ft. | Drive Shoe? Yes ___ No X | HOLE DIAM.

2 in. to 6.5 ft. Weight ______ lbs./ft. | 6.3 in. to 21.5 ft.

8. SCREEN: Make ______ | Or open hole from ______ ft. to ______ ft.

Type: Stainless Steel | Dia. 2 in.

Slot/Gauze: 0.01 | Length: 15 ft

Set between 21.5 ft. and 6.5 ft. | FITTINGS:

9. STATIC WATER LEVEL: 6.55 ft. [X] below land surface | ☐ above | Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ______ ft. after ______ hrs. pumping ______ g.p.m.

11. WELL HEAD COMPLETION: 1 Pitless adapter, manufacturer ______ model ______ | 2 Basement offset | 3 At least 12" above grade

12. WELL GROUTED? [X] Yes ☐ No

[X] Neat Cement CAP | [X] Bentonite | 3 ______

Grout material: bentonite from 6.5 to 4.5 ft. Cu. Yds.

cement 4.5 2

neat cement 2 0

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: 250 feet S direction unknown type Fire Training

Well disinfected upon completion? Yes ☐ No X

14. PUMP: Date Installed ______ [X] Not installed

Manufacturer's Name ______

Model Number ______ HP ______ Volts ______

Length of drop pipe ______ ft. capacity ______ g.p.m.

Material of drop pipe ______

Type: 1 Submersible | 2 L.S. Turbine | 3 Reciprocating | 4 Jet | 5 Centrifugal | 6 ______

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ______ License No. ______

Address ______

Signed ______ Authorized Representative ______ Date ______

Name of Driller ______ Date ______

IMPORTANT: FILE WITH DEED — WELL OWNER COPY 194814

HE-01588-01

STATE OF MINNESOTA DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.08

MINNESOTA UNIQUE WELL NO. 194815

for Water Sample

1. LOCATION OF WELL

County Name: St Louis

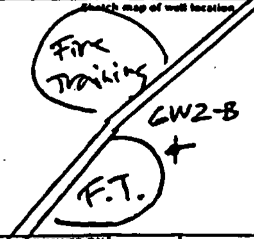
Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	1	SW ¼ SW ¼ NE ¼

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." N / S / E / W — 1 mile — ½ mi.

Addition Name / Block Number / Lot Number

Sketch map of well location



3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 15.0 ft.

Date of Completion: 11/14/86

5. 1 Cable tool, 2 Hollow rod, 3 Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 ☒ Power Auger, 10 Dug, 11 ____

6. USE: 1 Domestic, 2 Irrigation, 3 ☒ Test Well, 4 Public Supply, 5 Municipal, 6 Air Conditioning, 7 Industry, 8 Commercial, 9 ____

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Sandy Clay	red-brown	soft	0	7
Gravely Clay	red-brown	soft	7	10
Sandy Clay	red-brown	soft	10	15

Use a second sheet, if needed

7. CASING: 1 Black, 2 Galv., 3 Plastic, 4 ☒ Threaded, 5 Welded, ☒ S. Steel

HEIGHT: Above/Below Surface 2.41 ft.

Drive Shoe? Yes ___ No ☒

2 in. to 2.5 ft. Weight ___ lbs./ft.

HOLE DIAM.: 53 in. to 15 ft.

8. SCREEN: Make ___ Type: Stainless Steel. Dia. 2 in. Slot/Gauze 0.01 Length 10 ft. Set between 12.5 ft. and 2.5 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 2.4 ft. ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1 Pitless adapter, manufacturer ___ model ___; 2 Basement offset; 3 At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1 ☒ Neat Cement CAP, 2 Bentonite, 3 ___

Grout material	from	to	ft. Cu. Yds.
bentonite	2.5	2	
neat Cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~75 feet SW direction unknown / Fire Training type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP: Date Installed ___ ☒ Not Installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___ Type: 1 Submersible, 2 Jet, 3 L.S. Turbine, 4 Centrifugal, 5 Reciprocating, 6 ___

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative ___ Date ___

Name of Driller ___ Date ___

IMPORTANT:
FILE WITH DEED—WELL OWNER COPY

194815

HE-01205-01

STATE OF MINNESOTA DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample: 194816

1. LOCATION OF WELL

County Name: St. Louis

Township Name: | Township Number: 50 N | Range Number: 15 W | Section No.: 1 | Fraction: SE SE NW

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

Show exact location of well in section grid with "X." N S E W ½ mi. 1 mile

Addition Name | Block Number | Lot Number

Sketch map of well location: Fire Training, F.T., FGW2-A

3. PROPERTY OWNER'S NAME: Air National Guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 12.5 ft.

Date of Completion: 11/13/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silty Clay	red-brown	soft	0	3
Silty Sand	brown	soft	3	5
Silty Clay	brown	soft	5	12.5

Use a second sheet, if needed

7. CASING 1☐ Black 2☐ Galv. 3☐ Plastic ☒ Threaded 5☐ Welded ☒ S. Steel

HEIGHT: Above/Below Surface 2.61 ft.

Drive Shoe? Yes ___ No ☒

2 in. to 0.5 ft. Weight ___ lbs./ft.

HOLE DIAM.: 5.3 in. to 12.5 ft.

8. SCREEN

Make ___ Type: Stainless Steel Dia. 2 in.

Slot/Gauze 0.01 Length 10 ft.

Set between 10.5 ft. and 0.5 ft. FITTINGS:

Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 4.51 ☒ below land surface ☐ above. Date Measured 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION 1☐ Pitless adapter, manufacturer ___ model ___ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No

1☒ Neat Cement CAP 2☐ Bentonite 3☐

Grout material: neat cement from 0.5 to 0 ft. Cu. Yds.

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~75 feet N direction unknown Fire Training type

Well disinfected upon completion? Yes ☐ No ☒

14. PUMP

Date Installed ___ ☒ Not installed

Manufacturer's Name ___

Model Number ___ HP ___ Volts ___

Length of drop pipe ___ ft. capacity ___ g.p.m.

Material of drop pipe ___

Type: 1☐ Submersible 2☐ L.S. Turbine 3☐ Reciprocating 4☐ Jet 5☐ Centrifugal 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split spoon sample taken

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED—WELL OWNER COPY

194816

HE-01000-01

STATE OF MINNESOTA — DEPARTMENT OF HEALTH

WATER WELL RECORD

Minnesota Statutes 156A.01-.06

MINNESOTA UNIQUE WELL NO. for Water Sample: 194820

1. LOCATION OF WELL

County Name: St. Louis

Township Name	Township Number	Range Number	Section No.	Fraction
	50 N	15 W	2	SE SW NE

Distance and Direction from Road Intersections or Street Address and City of Well Location: Air National Guard Base, Duluth

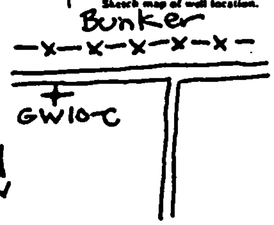
Show exact location of well in section grid with "X." (N / S / E / W, 1 mile, ½ mi.)

Addition Name:

Block Number:

Lot Number:

Sketch map of well location.



2. FORMATION LOG

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silt	brown	soft	0	2
Clayey Sandy Silt	orange-brown	soft	2	8.5
Sandy Silt	dark brown	soft	8.5	13.0
Bedrock			13.0	

Use a second sheet, if needed

3. PROPERTY OWNER'S NAME: Air National guard

Address: Duluth, MN 55811

4. WELL DEPTH (completed): 13.0 ft. — Date of Completion: 12/11/86

5. 1☐ Cable tool 2☐ Hollow rod 3☐ Rotary 4☐ Reverse 5☐ Air 6☐ Jetted 7☐ Driven 8☐ Bored 9☒ Power Auger 10☐ Dug 11☐

6. USE: 1☐ Domestic 2☐ Irrigation 3☒ Test Well 4☐ Public Supply 5☐ Municipal 6☐ Air Conditioning 7☐ Industry 8☐ Commercial 9☐

7. CASING: 1☐ Black 2☐ Galv. 3☐ Plastic 4☒ Threaded 5☐ Welded 6☒ S. Steel — HEIGHT: Above/Below Surface 1.8 ft. — Drive Shoe? Yes ___ No X

2 in. to 3 ft. Weight ___ lbs./ft.

HOLE DIAM.: 8 in. to 13 ft.

8. SCREEN — Make: ___ Or open hole from ___ ft. to ___ ft.

Type: Stainless Steel — Dia. 2 inch

Slot/Gauze: 0.01 — Length: 10 ft

Set between 13.0 ft. and 3.0 ft. — FITTINGS:

9. STATIC WATER LEVEL: 4.49 ft. ☒ below land surface ☐ above — Date Measured: 1/12/87

10. PUMPING LEVEL (below land surface) ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1☐ Pitless adapter, manufacturer ___ model ___ 2☐ Basement offset 3☐ At least 12" above grade

12. WELL GROUTED? ☒ Yes ☐ No — 1☒ Neat Cement CAP 2☒ Bentonite 3☐

Grout material	from	to	ft. Cu. Yds.
bentonite	3	2	
Cement	2	0	

13. NEAREST SOURCES OF POSSIBLE CONTAMINATION: ~60 feet SSE direction — type: Unknown Site 10

Well disinfected upon completion? Yes☐ No☒

14. PUMP — Date installed ___ ☒ Not installed

Manufacturer's Name ___ Model Number ___ HP ___ Volts ___ Length of drop pipe ___ ft. capacity ___ g.p.m. Material of drop pipe ___ Type: 1☐ Submersible 2☐ Jet 3☐ L. S. Turbine 4☐ Centrifugal 5☐ Reciprocating 6☐

15. REMARKS, ELEVATION, SOURCE OF DATA, etc.

Split Spoon samples taken.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Licensee Business Name ___ License No. ___

Address ___

Signed ___ Authorized Representative — Date ___

Name of Driller ___ Date ___

IMPORTANT: FILE WITH DEED — WELL OWNER COPY — 194820

HE 01806 01

APPENDIX J

REFERENCES

REFERENCES

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TABLE 4-1

WATER QUALITY RESULTS
FIRE TRAINING AREAS

Well No.	Oil and Grease (mg/l)	TOX (ug/l)	TOC (mg/l)	Nitrates (mg/l)	Temp (C°)	pH	Specific Cond. (umhos-cm)
MW-1	0.19	44.3	35.0	0.48	9	7.08	816
MW-2	0.53	602.6	67.5	0.55	6	7.10	820
MW-3	0.86	81.7	66.2	0.93	9	6.91	1107
MW-4	0.42	15.9	5.6	0.39	5	7.10	574
MW-5	0.75	28.0	44.6	0.35	9	7.40	360
MW-6	0.27	15.4	24.6	0.38	7	7.30	636
MW-7	0.38	126.3	17.0	0.47	7	7.50	657
Detect. Limit	0.1	5.0	1.0	0.1	—	—	--

TABLE 4-2

SUMMARY OF WATER QUALITY RESULTS
FUEL STORAGE AREA, DIAP
SAMPLED 15 NOVEMBER 1983

	TOC (mg/l)	Oil & Grease (mg/l)	Pb (mg/l)	Temp.[1] (C°)	pH[1]	Specific Conductance[1] μmhos/cm
Monitoring Wells						
MW-8	49.3	0.36	< .020	8°	6.90	578
MW-9	70.0	1.46	< .020	5°	7.25	782
MW-10	49.0	49.80	< .020	8°	7.18	608
MW-11	17.0	< .10	< .020	8°	6.55	716
Test Pit 2	140	3240	0.031			
Drainage S-1	<1.0	47.20	< .020			
S-2	20.5	48.00	< .020			
Detection Limits	1.0	.10	< .020			

1 - Determined in the field at time of sampling

TABLE 4-3 SUMMARY OF SURFACE WATER AND BOTTOM SEDIMENT ANALYTICAL DATA GOOSE MISSILE SITE DISPOSAL AREA (Sampled 16 November 1983)

Sampling Location	BOTTOM SOIL SAMPLES: Pesticides in Soils		SURFACE WATER SAMPLES: Pesticides in Water		TOC	TOX
	D.D.D. (µg/g)	Arochlor-1260[1] (µg/g)	D.D.D. µg/l	Arochlor-1260[1] µg/l	mg/l	µg/l
1	0.139	0.450	<0.1	<0.1	10.9	12.6
2	0.112	0.070	<0.1	<0.1	8.8	11.0
3	0.092	0.360	<0.1	<0.1	9.7	13.9
4	0.100	1.200	<0.1	<0.1	9.7	5.9
5	0.001	0.020	DRY			
6	0.215	1.300	0.18	0.2	11.5	24.1
7	0.132	0.320	<0.1	<0.1	11.0	16.5
8	0.016	0.080	<0.1	<0.1	8.85	< 5.0
9	0.056	0.160	<0.1	<0.1	10.7	29.1
10	0.001	0.010	DRY			
11	0.001	0.010	DRY			
Detection Limit	0.001	0.010	0.1	0.1	1.0	5.0

NF = Not Found

[1] PCB compound detected in pesticide analysis by EPA Method 608

TABLE 4-4 SUMMARY OF SOIL CHEMISTRY DATA
DPDO STORAGE AREA "C"

	Depth (in ft.)	Oil and Grease ug/gm	Chloro-form ug/gm	Trichloro-ethylene ug/gm	1,1,1-Trichloro-ethane ug/gm	Bromodi-chloro-methane ug/gm	Dibromo-chloro-methane ug/gm	Tetra-chloro-ethylene ug/gm	Trans-1,2-Dichloro-ethylene ug/gm	1,2-Dichloro-ethane ug/gm	1,1-Dichloro-ethylene ug/gm	1,1-Dichloro-ethane ug/gm
C-1	0-1	16,700	0.025	--	0.011	--	--	--	--	--	--	--
	1-2	16,700	--	--	--	--	--	--	--	--	--	--
C-2	0-1	23,400	0.120	--	--	0.001	--	--	--	--	--	--
	1-2	5,700	--	--	--	--	--	--	--	--	--	--
C-3	0-1	23,400	--	--	--	--	--	--	--	--	0.006	--
	1-2	5,600	0.047	--	--	--	--	0.002	--	--	--	--
C-4	0-1	35,400	0.315	0.005	0.003	0.008	--	0.001	--	--	--	--
	1-2	14,500	0.066	--	--	--	--	--	--	--	--	--
C-5	0-1	13,400	0.076	0.210	--	--	--	--	--	--	--	--
	1-2	3,660	0.048	0.940	--	--	--	--	--	--	--	--
C-6	0-1	41,800	0.061	0.002	0.011	--	--	0.300	--	--	--	--
	1-2	13,400	0.073	--	0.210	--	--	0.220	--	--	--	--
C-7	0-1	40,600	0.055	--	--	--	--	--	0.006	--	--	--
	1-2	13,100	0.018	--	--	--	--	--	--	--	--	--
C-8	0-1	49,500	--	--	--	--	--	--	--	--	0.015	--
	1-2	16,900	--	--	0.014	--	0.003	--	--	--	--	--
C-9	0-1	7,325	--	--	--	--	--	0.001	--	0.003	0.032	0.012
	1-2	243	--	--	--	--	--	--	--	0.018	0.037	0.013
C-10	0-1	194	--	--	--	--	--	--	--	0.003	0.015	0.022
	1-2	161	--	--	--	--	--	--	0.014	0.003	0.012	0.007
S-1	0-.5	11,000	0.240	0.140	0.001	0.016	--	--	0.500	--	--	--
S-2	0-.5	3,470	0.720	0.020	0.001	0.006	--	--	--	--	--	--
Detection limits		0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

-- Below minimum detection limit.

TABLE 4-5

COMPARISON OF DIAP WATER QUALITY RESULTS
WITH APPLICABLE STANDARDS, GUIDELINES AND CRITERIA [1]

Detected Paramters	Drinking Water Standards Minnesota and Federal	Quality Criteria for Water	Monitoring Points Exceeding Standard
TOC	-	-	-
TOX	-	-	-
OIL & GREASE	-	0.01 [2]	ALL
LEAD	0.05 [3]	0.05 [3]	NONE
DDD	-	0.000[3]	SW-6[4]
NITRATE	10.0	-	NONE
SPECIFIC CONDUCTANCE	1000 [5]	-	MW-3

1 mg/l unless otherwise noted.

2 Virtually free of oil and grease for domestic water supply.

3 Health related.

4 Surface Water sample No. 6, Goose Missile Site Disposal Area.

5 u mhos/cm, Wildlife related.

APPENDIX K

BIOGRAPHIES OF KEY PERSONNEL

Curriculum Vitae

MICHAEL W. ANDER

Title Senior Environmental Scientist/Associate

Expertise Environmental Analysis/Impact Assessment
Environmental Auditing

Experience With Firm Conducts and manages hazardous waste contamination studies for industrial and government clients throughout the United States. Joined Dames & Moore in 1973.

Senior Environmental Scientist/Associate

- Environmental audits and risk assessments for several industrial facilities in the Midwest.
- Geohydrologic assessment of a chemically contaminated plant site in Michigan, including evaluation of containment and treatment measures.
- Geohydrologic assessment of a chemical waste disposal facility in Michigan.
- Environmental studies and development of remedial actions for over thirty PCB-contaminated industrial sites throughout the Midwest.
- Environmental analysis and impact assessment report for a 600-megawatt electric coal-fired power plant in Missouri.
- Assessment of the impact to benthic and fish communities generated by the increase of industrial effluent to a river in northern Illinois.
- Land reclamation study for a highly acidic, abandoned coal strip mine in north-central Illinois.
- Evaluation of the environmental enhancement resulting from the dredging of polluted sediments from the Little Calumet River in Illinois.
- Study of the economic and environmental implications of developing low-head hydroelectric power on the Fox River in Illinois.
- Environmental assessment of lead in the soils and ground water near a battery reprocessing plant in Illinois.
- Environmental assessment of selected river basins, tributary to the Illinois River, for a statewide stream survey for the Illinois Environmental Protection Agency. Project involved the analysis of nearly 2,000 benthic samples.

Assistant Project Manager

- Environmental baseline studies and impact assessment of copper/zinc mine in northern Wisconsin, including analysis and evaluation of fisheries, plankton, and periphitic algae with special emphasis on water chemistry and benthis macroinvertebrates.
- Preparation and coordination of final safety analysis report and an environmental report of a nuclear power plant in Missouri.

Principal Investigator/Aquatic Ecologist

- Environmental studies required for the preparation of permit applications and reclamation plans for several coal mines and a coal preparation plant in eastern Kentucky.
- Environmental assessment of dredging an estuary and salt marsh for a chemical plant in South Carolina. Project included an analysis and evaluation of fisheries, plankton, and water chemistry with special emphasis on the collection and analysis of benthic macroinvertebrates.

	Project Quality Assurance Coordinator • Management of numerous projects requiring quality assurance in compliance with Nuclear Regulatory Commission regulations. • Implementation of Dames & Moore's quality assurance manual on all nuclear-related projects.
Past Experience	Four years experience in aviation electronics. Aviation Electronics Technican, U.S. Navy (1969-1973) • Maintenance of electronic systems of A-7 attact aircraft. • Counselor, Naval Drug Rehabilitation Center.
Academic Background	M.S. (1970), biological sciences, and B.S. (1967), biological sciences, Northern Illinois University
Citizenship	United States
Countries Worked In	United States
Langugage Proficiency	English
Professional Affiliations	North American Benthological Society; International Oceanographic Foundation; Illinois Association of Environmental Professionals; Ecological Society of America.
Registrations	Certified SCUBA Diver

† † †

Curriculum Vitae

BEVERLY J. HARPER

Title Project Ecologist

Expertise Environmental Analysis and Impact Assessment
Aquatic Ecology

Experience with Firm Conducts and manages environmental studies and impact assessments for industrial and government clients throughout the United States. Joined Dames & Moore in 1973 and rejoined the firm in 1985 after a 2-year absence.

Principal Investigator/Aquatic Ecologist

- o Evaluation of the environmental enhancement resulting from the dredging of polluted sediments from the Little Calumet River in Illinois.
- o Coordination of environmental baseline studies and impact assessment for a copper/zinc mine in northern Wisconsin.
- o Environmental assessment of potential chemical contamination in the Menominee River, Wisconsin.
- o Environmental site assessments of various sites throughout the country for purposes of acquisition.
- o Assessment of the impact to aquatic communities by the increase of industrial effluent to a river in northern Illinois.
- o Zooplankton specialist with experience in environmental studies in Florida, Maryland, South Carolina, Texas, and Wisconsin.
- o Supervision of the Environmental Laboratory, Park Ridge office. Implemented laboratory quality assurance program.
- o Supervision of the analysis of data from several environmental studies.
- o Team leader for various environmental field investigations.
- o Technical reviewer for biology sections for a nuclear power plant biological monitoring study.
- o Biological studies and environmental monitoring for various nuclear power plant projects construction and operating licensing.

Assistant Project Manager

- o Preparation and coordination of Final Safety Analysis and Environmental Reports for a nuclear power plant in Kansas and other nuclear plants nationwide.
- o Environmental baseline studies and impact assessment for a 600-megawatt electric coal-fired power plant in Missouri.
- o Hazardous waste field investigations, feasibility studies, and cleanup strategies for numerous U.S. Air Force facilities throughout the United States.

BEVERLY J. HARPER
Page Two

Academic Background	B.S., Biology, Northern Illinois University, 1971. Coursework completed towards M.S. with emphasis in Ecology, Northern Illinois University.
Citizenship	United States
Countries Worked In	United States
Language Proficiency	English
Professional Affiliations	North American Benthological Society International Oceanographic Foundation National Audubon Society

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Curriculum Vitae

THOMAS E. JENSEN

Title
Senior Geologist/Geophysicist

Expertise
Engineering Geophysics
Applied Instrumentation
General Geology

Experience With Firm
Principal Investigator

- Seismic investigations to develop engineering properties using combinations of seismic refraction, uphole/downhole, crosshole, surface wave, and ambient motion studies; conducted for nuclear and fossil-fueled power plants, nuclear fuel storage reprocessing and research facilities, fault investigations, and correctional facilities.
- Reconnaissance and feasibility studies for depth of bedrock, bedrock topography, water table, and rippability using seismic refraction methods.
- Evaluation of soil improvement through geophysical testing.
- Geotechnical investigation for water bottom and subsurface conditions for a pipeline river crossing using high resolution reflection, side-scan sonar, and bottom probes.
- Vibration control and attenuation studies of production quarrying and excavation blasting operations; conducted for nuclear power plants, a nuclear fuel processing facility, a petroleum pipeline and sewer interceptor, and residential and commercial structures.
- Vibration monitoring of production and excavation blasting, pile driving, earthwork, and machinery operation.
- Recommendations and performance evaluation of controlled blasting operations for smoothwall excavations.
- Borehole geophysical logging.
- Electrical resistivity profiling and depth sounding.
- Rock mechanics studies for a longwall coal mining demonstration.
- Geologic and hydrogeologic studies for baseline data to prepare environmental impact assessment and permit applications.
- Structure evaluation by high resolution seismic reflection surveys, test drilling, borehole logging and uphole surveys for a field scale test site for aquifer storage and for compressed air energy storage.

Project Manager

- Preparation of soils, geology, hydrology, and sociocultural baseline reports for an environmental impact assessment.
- Rock mechanics studies for a longwall coal mining demonstration.

Technical Reviewer

- Provide technical review of seismic investigations for nuclear-related projects.
- Review of high resolution marine reflection and refraction surveys.
- Review of test blasting, blast monitoring, and attenuation studies.

Past Experience

Geophysicist, Texaco Incorporated, Houston, Texas and New Orleans, Louisiana

- Involved in interpretation of offshore Gulf of Mexico seismic refraction data.
- Participated in preparation of map packages for lease sales.

Academic Background

B.S. and M.S., geology, Northern Illinois University
Seminar and workshops on engineering geophysics, Colorado School of Mines

Professional Affiliations

Society of Exploration Geophysicists

Registrations

Geophysicist, California

• • •

Curriculum Vitae

AMY D. LAMBORG

Title	Assistant Geologist
Expertise	Geology, Geohydrology
Experience with Firm	o Supervised field investigations of several large hydrogeologic/hazardous waste projects for U.S. Air Force. Field efforts included monitor well installation and sampling, soil boring description and sampling, and surface water and surface soil sampling for bases in Fairbanks, Clear, and Anchorage, Alaska and Duluth, Minnesota. o Completed geohydrological field investigation at a hazardous waste landfill in Plymouth, Indiana, which included monitor well installation, soil sampling, and slug testing. o Performed site assessment at a plastics manufacturing plant in north-central Illinois. Program included collecting composite soil and water samples for analyses. o Logged test pits, collected soil and water samples, and installed monitor wells for railroad yards in Chicago, Illinois. o Sampled drums of hazardous waste at an industrial site in Elgin, Illinois.
Past Experience	Geologist, Amoco Production Company o Evaluated wells for recompletion potential, southeastern New Mexico. Geologist, Wayne Pryor and Associates o Constructed structure and isopach maps for Mississippian formations in south-central Illinois. Geological Technician, Gulf Oil Company o Constructed regional cross sections, structure and isopach maps from computer data base for offshore Gulf Coast.
Academic Background	M.S., Geology, University of Cincinnati, 1986. Thesis topic: "Development and Distribution of Primary and Secondary Porosity in the Salem Limestone, South-Central Illinois." B.A., Geology, Earlham College, 1980
Awards	Amoco Production Company Fellowship, 1983 University Graduate Scholarship, 1982 Teaching Assistantship, 1982 Weber Scholar - Athlete Award, 1980
Countries Worked in	United States Argentina
Language Proficiency	English Spanish
Professional Affiliations	American Association of Petroleum Geologists

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Dames & Moore

Curriculum Vitae

GLENN D. MARTIN

Title	Managing Partner (Ltd.), Chicago Office
Expertise	Waste Management Project Management
Experience with Firm	Waste Management

- o Directed risk assessments for potentially leaking underground storage tanks at 56 sites nationwide. More than 250 tanks containing 18 different products were addressed in the study. Assessments included analyses of hydrogeology, potential contaminant receptors, and the likely behavior of contaminants under a variety of ground water conditions. Program included development of leak response protocols and cleanup protocols.
- o Directed petroleum contamination assessment at an abandoned tank farm in a tidally controlled embayment in Massachusetts.
- o Directed remedial investigation/feasibility study (RI/FS) at an abandoned salvage yard in northern Ohio contaminated with PCBs.
- o Directed remedial investigation at coal mine in south-central Illinois contaminated by organic solvents and PCBs.
- o Directed hydrogeological investigations at a sanitary landfill in Kansas City, Kansas.
- o Directed hydrogeological investigation at a sanitary landfill in western Missouri.
- o Directed hydrogeological assessment at the Four County Hazardous Waste Landfill in Fulton County, Indiana.
- o Directed remedial investigation at abandoned railyard in downtown Chicago proposed for commercial/residential development.
- o Directed remedial investigation at active railyard in suburban Chicago.
- o Directed site contamination assessment at oil terminal near Griffith, Indiana.
- o Directed PCP ground water contamination assessment at a wood treatment facility in Wisconsin.
- o Prepared ground water assessment at a proposed coal ash landfill in southwestern Ohio.
- o Directed ground water contamination assessment at an industrial facility in west-central Ohio.
- o Directed ground water contamination assessment at a gray water spray irrigation field in west-central Ohio.

Dames & Moore

Other Experience

- o Directed ground water supply studies in Four Mile Creek outwash valley for the City of Oxford, Ohio. Program involved extensive use of test borings, geophysics, and pump tests to identify and confirm the supply potential. Program required public presentation of findings.
- o Directed multiyear, multidisciplinary studies for the Abu Dhabi National Oil Company. Studies entailed extensive field investigations pertaining to marine environment involving more than 30 Dames & Moore professional and support personnel. Studies included development of waste management guidelines for a major industrial complex.

Academic Background — B.A., Geology, University of Cincinnati

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Curriculum Vitae

Carol Jean Scholl

Title	Project Geologist
Expertise	Geology Ground-Water Hydrology

Experience With Firm Provides consultation on geologic and ground-water aspects of the firm's hazardous waste, nuclear and mining projects. Joined Dames & Moore in 1973 and rejoined the firm in 1983.

Project Geologist

- Performed cost-effectiveness analyses of alternate disposal methods for hazardous waste contaminated soils.
- Designed and managed hazardous waste field investigations at U.S. Air Force installations in seven states. The program involved the analysis and evaluation of hazardous materials in soil and ground water including fuels, solvents and trace metals.
- Managed field investigations to assess the environmental impacts of the uncontrolled disposal of heavy metals and industrial wastes in till plain soils.

Staff Geologist

- Planned and managed a hydrogeologic investigation of a waste management facility for a petrochemical firm.
- Performed environmental assessments on the impacts of landfills to the environment.
- Designed and managed a field investigation involving the impact of a chemical process facility on ground water and surface water quality.
- Prepared personnel safety plans for investigations at hazardous waste sites.
- Served as Dames & Moore's group contact coordinator for the Electric Power Research Institute's Seismic Risk Hazard Analysis Program performed in the eastern United States.
- Prepared responses to questions posed by the Nuclear Regulatory Commission concerning faulting studies for a nuclear power plant in southern Indiana.

Assistant Geologist

- Assisted in the compilation and reduction of ground-water data for preliminary safety analysis reports for three potential nuclear power plant sites in Kansas, Missouri and

Illinois.

- Participated in detailed field structural geological studies of a potential nuclear power plant site in Pennsylvania.
- Performed engineering geological duties for a rock coring and soil sampling program at a nuclear power plant site in northwestern Illinois.
- Assisted in the reduction of ground-water data for a hydrologic study of a proposed coal strip mine in eastern Montana.

Past Experience

A total of ten years experience in geology education and research.

Head of Group Programs/Instructor of Geology, Field Museum of Natural History, Chicago

- Supervised professional and clerical staff members of a division of the Department of Education.
- Participated in planning and decisions regarding departmental policies, budgets and procedures.
- Instructed school groups, adult volunteers and other adult groups in geology.
- Trained adult volunteers to present geology tours.
- Supervised a manned exhibit featuring a hands-on environment of natural history specimens.

Graduate Teaching Fellow and Associate/Graduate Teaching Assistant, Miami University, Oxford, Ohio

- Studies course work toward Ph.D., with emphasis on geochemistry and mineralogy.

Academic Background

M.S. (1970), geology, Miami University, Oxford, Ohio
B.S. (1966), geology, Kent State University, Ohio

Citizenship

United States

Countries Worked In

United States

Language Proficiency

English

Professional Affiliations

American Association for the Advancement of Science; Mineralogical Society of America; National Water Well Association.

Emp-No: 06046 Vers-No: 01 Date: 06/26/87

Curriculum Vitae

BETH J. SCHOEPKE

Title	Assistant Hydrogeologist
Expertise	Hydrogeology Geology
Experience	o Conducted hydrogeologic survey on waste disposal site in Michigan. Included total ground water discharge to river, contaminant concentrations of discharge, annual loading to river, and final river concentration after dilution. o Used pumping test data to determine transmissivity, storativity, and permeability of confined aquifer. o Performed resistivity survey for contaminant plume and stratigraphic analysis of waste disposal site in Michigan. o Analyzed data and prepared a site assessment report for a site in Minnesota. o Performed two site assessment investigations on adjacent areas and devised a plan to interface and simplify the data. o Mapped the piezometric surface of an area in Duluth, Minnesota. o Developed original topographic and geologic maps, as well as stratigraphic columns, for various projects. o Performed grain size analysis of soil in the laboratory.
Academic Background	Coursework completed toward M.S. with emphasis on Hydrogeology, Northeastern Illinois University B.S., Earth Science, Geology, 1985, Northeastern Illinois University
Seminars	Participated in Dames & Moore Health and Safety Seminar (1987)
Citizenship	United States
Countries Worked In	United States
Language Proficiency	English

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APPENDIX L

GEOPHYSICAL TRACINGS

EM SURVEY DATA TABULATION

E-W STATION	N-S STATION	E-W READING (mmhos/m)	N-S READING (mmhos/m)	EW/NS AVERAGE (mmhos/m)	EW/NS DIFFER. (mmhos/m)
0	0	24.00	24.40	24.20	0.40
0	-20	24.00	24.00	24.00	0.00
0	-40	24.60	24.20	24.40	0.40
0	-60	23.20	23.40	23.30	0.20
0	-80	22.40	22.60	22.50	0.20
0	-100	24.80	24.60	24.70	0.20
0	-120	27.20	26.40	26.80	0.80
0	-140	27.40	27.80	27.60	0.40
0	-160	24.40	24.20	24.30	0.20
0	-180	21.20	20.80	21.00	0.40
0	-200	20.80	21.00	20.90	0.20
0	-220	29.60	30.00	29.80	0.40
0	-240	19.80	8.60	14.20	11.20
0	-260	41.60	30.80	36.20	10.80
0	-280	21.40	11.40	16.40	10.00
0	-300	24.00	23.80	23.90	0.20
0	-320	32.40	34.60	33.50	2.20
0	-340	50.80	32.20	41.50	18.60
0	-360	46.00	43.80	44.90	2.20
0	-380	33.60	34.20	33.90	0.60
0	-400	37.80	3.20	20.50	34.60
0	-420	38.80	37.20	38.00	1.60
0	-440	26.40	26.80	26.60	0.40
0	-460	24.80	24.80	24.80	0.00
0	-480	24.80	25.60	25.20	0.80
0	-500	26.20	26.00	26.10	0.20
0	-520	25.80	25.80	25.80	0.00
0	-540	26.80	25.80	26.30	1.00
0	-580	38.40	39.40	38.90	1.00
0	-600	28.60	29.20	28.90	0.60
0	-620	26.20	26.00	26.10	0.20
0	-640	23.60	23.40	23.50	0.20
0	-660	20.00	19.20	19.60	0.80
0	-680	26.20	26.60	26.40	0.40
0	-700	1.40	14.20	7.80	12.80
20	-700	37.60	30.20	33.90	7.40
20	-680	22.40	21.20	21.80	1.20
20	-660	22.00	22.20	22.10	0.20
20	-640	26.20	26.40	26.30	0.20
20	-620	28.00	27.40	27.70	0.60
20	-600	34.80	54.40	44.60	19.60
20	-560	37.60	42.20	39.90	4.60
20	-540	27.00	25.00	26.00	2.00
20	-520	24.20	24.80	24.50	0.60
20	-500	24.20	23.80	24.00	0.40
20	-480	25.00	24.60	24.80	0.40
20	-460	25.00	25.20	25.10	0.20

20	-440	24.20	22.80	23.50	1.40
20	-420	30.20	32.60	31.40	2.40
20	-400	23.00	4.60	13.80	18.40
20	-380	32.20	33.40	32.80	1.20
20	-360	37.00	39.80	38.40	2.80
20	-340	34.00	17.40	25.70	16.60
20	-320	32.40	31.40	31.90	1.00
20	-300	26.20	26.20	26.20	0.00
20	-280	32.80	38.40	35.60	5.60
20	-260	17.60	3.00	10.30	14.60
20	-240	34.60	34.60	34.60	0.00
20	-220	27.60	26.80	27.20	0.80
20	-200	24.40	24.40	24.40	0.00
20	-180	25.60	24.20	24.90	1.40
20	-160	24.80	24.80	24.80	0.00
20	-140	25.80	25.40	25.60	0.40
20	-120	27.20	26.80	27.00	0.40
20	-100	25.00	25.60	25.30	0.60
20	-80	22.60	22.00	22.30	0.60
20	-60	22.00	21.60	21.80	0.40
20	-40	23.80	23.80	23.80	0.00
20	-20	24.00	23.40	23.70	0.60
20	0	23.80	23.80	23.80	0.00
40	0	22.80	23.80	23.30	1.00
40	-20	22.80	22.20	22.50	0.60
40	-40	25.60	27.20	26.40	1.60
40	-60	67.60	53.60	60.60	14.00
40	-80	80.80	62.40	71.60	18.40
40	-100	73.20	62.20	67.70	11.00
40	-120	85.40	67.00	76.20	18.40
40	-140	83.00	67.00	75.00	16.00
40	-160	76.80	68.60	72.70	8.20
40	-180	73.80	64.60	69.20	9.20
40	-200	75.80	64.00	69.90	11.80
40	-220	82.60	68.40	75.50	14.20
40	-240	78.60	61.40	70.00	17.20
40	-260	55.60	50.80	53.20	4.80
40	-280	21.80	28.00	24.90	6.20
40	-300	31.00	31.00	31.00	0.00
40	-320	31.80	33.00	32.40	1.20
40	-340	57.80	15.60	36.70	42.20
40	-360	32.60	33.20	32.90	0.60
40	-380	27.80	28.00	27.90	0.20
40	-400	44.00	15.40	29.70	28.60
40	-420	40.00	41.80	40.90	1.80
40	-440	24.20	24.20	24.20	0.00
40	-460	22.60	22.80	22.70	0.20
40	-480	23.80	24.00	23.90	0.20
40	-500	24.60	23.80	24.20	0.80
40	-520	24.60	24.60	24.60	0.00
40	-540	27.60	28.00	27.80	0.40
40	-560	29.20	31.00	30.10	1.80
40	-580	216.00	88.60	152.30	127.40
40	-600	32.60	33.80	33.20	1.20
40	-620	33.40	34.00	33.70	0.60
40	-640	40.60	41.20	40.90	0.60

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40	-660	172.80	71.20	122.00	101.60
40	-700	30.20	91.00	60.60	60.80
40	-720	14.80	48.80	31.80	34.00
40	-740	34.80	3.00	18.90	31.80
60	-740	36.60	3.80	20.20	32.80
60	-720	26.80	33.40	30.10	6.60
60	-700	18.80	18.60	18.70	0.20
60	-680	30.40	32.20	31.30	1.80
60	-660	79.00	114.80	96.90	35.80
60	-640	168.00	110.80	139.40	57.20
60	-620	91.40	399.40	245.40	308.00
60	-600	206.80	103.60	155.20	103.20
60	-580	57.20	56.20	56.70	1.00
60	-560	38.40	37.00	37.70	1.40
60	-540	30.80	32.80	31.80	2.00
60	-520	27.40	27.40	27.40	0.00
60	-500	28.60	28.80	28.70	0.20
60	-480	27.80	27.80	27.80	0.00
60	-460	26.00	25.80	25.90	0.20
60	-440	27.40	28.40	27.90	1.00
60	-420	19.20	33.80	26.50	14.60
60	-400	45.80	36.40	41.10	9.40
60	-380	23.80	25.00	24.40	1.20
60	-360	31.00	29.00	30.00	2.00
60	-340	114.60	13.60	64.10	101.00
60	-320	34.20	35.40	34.80	1.20
60	-300	34.80	24.80	29.80	10.00
60	-280	41.80	48.00	44.90	6.20
80	-280	38.80	26.00	32.40	12.80
80	-300	42.00	47.60	44.80	5.60
80	-320	37.40	45.00	41.20	7.60
80	-340	27.00	21.20	24.10	5.80
80	-360	37.80	38.40	38.10	0.60
80	-380	24.40	23.00	23.70	1.40
80	-400	41.60	37.60	39.60	4.00
80	-420	48.80	35.00	41.90	13.80
80	-440	28.60	28.00	28.30	0.60
80	-460	27.60	26.40	27.00	1.20
80	-480	28.80	29.20	29.00	0.40
80	-500	39.60	43.40	41.50	3.80
80	-520	64.00	58.80	61.40	5.20
80	-540	157.80	133.20	145.50	24.60
80	-560	263.60	368.20	315.90	104.60
80	-580	225.40	257.80	241.60	32.40
80	-600	76.80	59.00	67.90	17.80
80	-620	38.80	35.80	37.30	3.00
80	-640	29.40	28.80	29.10	0.60
80	-660	32.00	29.80	30.90	2.20
80	-680	27.00	24.60	25.80	2.40
80	-700	19.60	19.80	19.70	0.20
80	-720	19.20	19.20	19.20	0.00
80	-740	20.20	19.80	20.00	0.40
100	-740	20.00	21.00	20.50	1.00
100	-720	19.00	19.00	19.00	0.00
100	-700	21.20	21.80	21.50	0.60
100	-680	24.00	23.60	23.80	0.40

100	-660	25.20	25.20	25.20	0.00
100	-640	25.60	26.00	25.80	0.40
100	-620	27.80	27.00	27.40	0.80
100	-600	29.40	29.00	29.20	0.40
100	-580	32.60	32.20	32.40	0.40
100	-560	47.20	48.00	47.60	0.80
100	-540	93.00	73.20	83.10	19.80
100	-520	194.20	225.40	209.80	31.20
100	-500	399.20	399.40	399.30	0.20
100	-480	213.40	99.80	156.60	113.60
100	-460	55.40	55.20	55.30	0.20
100	-440	41.80	42.40	42.10	0.60
100	-420	37.40	7.20	22.30	30.20
100	-400	34.40	33.00	33.70	1.40
100	-380	30.00	31.20	30.60	1.20
100	-360	32.80	34.20	33.50	1.40
100	-340	59.60	17.20	38.40	42.40
100	-320	44.80	46.20	45.50	1.40
100	-300	32.80	36.60	34.70	3.80
100	-280	36.80	38.80	37.80	2.00
120	-280	35.60	37.60	36.60	2.00
120	-300	32.00	31.60	31.80	0.40
120	-320	41.00	32.20	36.60	8.80
120	-340	61.60	6.40	34.00	55.20
120	-360	39.20	39.00	39.10	0.20
120	-380	36.20	36.80	36.50	0.60
120	-400	63.20	62.00	62.60	1.20
120	-420	130.20	114.20	122.20	16.00
120	-440	399.60	399.80	399.70	0.20
120	-460	272.20	389.60	330.90	117.40
120	-480	89.60	55.80	72.70	33.80
120	-500	39.00	38.00	38.50	1.00
120	-520	40.20	39.40	39.80	0.80
120	-540	44.60	47.60	46.10	3.00
120	-560	38.40	39.60	39.00	1.20
120	-580	28.00	27.40	27.70	0.60
120	-600	25.00	24.60	24.80	0.40
120	-620	23.80	22.80	23.30	1.00
120	-640	27.00	27.00	27.00	0.00
120	-660	25.20	25.00	25.10	0.20
120	-680	23.80	24.20	24.00	0.40
120	-700	22.20	22.00	22.10	0.20
120	-720	19.20	19.60	19.40	0.40
120	-740	17.60	18.00	17.80	0.40
120	-760	22.20	23.00	22.60	0.80
140	-760	26.60	26.60	26.60	0.00
140	-740	20.20	19.60	19.90	0.60
140	-720	20.80	20.00	20.40	0.80
140	-700	22.00	22.40	22.20	0.40
140	-680	22.80	23.60	23.20	0.80
140	-660	24.80	23.80	24.30	1.00
140	-640	24.40	23.40	23.90	1.00
140	-620	26.00	26.00	26.00	0.00
140	-600	25.20	25.80	25.50	0.60
140	-580	24.40	24.00	24.20	0.40
140	-560	29.20	26.40	27.80	2.80

140	-540	35.20	34.60	34.90	0.60
140	-520	25.60	24.20	24.90	1.40
140	-500	23.20	22.40	22.80	0.80
140	-480	22.80	23.40	23.10	0.60
140	-460	31.60	31.80	31.70	0.20
140	-440	55.80	51.20	53.50	4.60
140	-420	118.60	70.00	94.30	48.60
140	-400	182.80	305.60	244.20	122.80
140	-380	292.80	277.80	285.30	15.00
140	-360	269.00	210.40	239.70	58.60
140	-340	86.00	68.60	77.30	17.40
140	-320	58.80	56.20	57.50	2.60
140	-300	51.00	50.20	50.60	0.80
140	-280	59.60	61.60	60.70	1.80
160	-360	73.20	73.20	73.20	0.00
160	-380	36.80	36.80	36.80	0.00
160	-400	29.00	29.00	29.00	0.00
160	-420	49.80	49.80	49.80	0.00
160	-440	49.00	49.00	49.00	0.00
160	-460	27.80	27.80	27.80	0.00
160	-480	19.00	19.00	19.00	0.00
160	-500	22.20	22.20	22.20	0.00
160	-520	23.60	23.60	23.60	0.00
160	-540	24.40	24.40	24.40	0.00
160	-560	32.20	32.20	32.20	0.00
160	-580	31.00	31.00	31.00	0.00
160	-600	29.60	29.60	29.60	0.00
160	-620	27.40	27.40	27.40	0.00
160	-640	24.80	24.80	24.80	0.00
160	-660	27.20	27.20	27.20	0.00
160	-680	27.20	27.20	27.20	0.00
160	-700	27.00	27.00	27.00	0.00
160	-720	28.20	28.20	28.20	0.00
160	-740	27.40	27.40	27.40	0.00
160	-760	19.40	19.40	19.40	0.00
160	-780	29.00	29.00	29.00	0.00
180	-780	20.20	20.20	20.20	0.00
180	-760	23.60	23.60	23.60	0.00
180	-740	30.40	30.40	30.40	0.00
180	-720	26.60	26.60	26.60	0.00
180	-700	38.80	38.80	38.80	0.00
180	-680	29.00	29.00	29.00	0.00
180	-660	26.40	26.40	26.40	0.00
180	-640	26.40	26.40	26.40	0.00
180	-620	29.20	29.20	29.20	0.00
180	-600	30.80	30.80	30.80	0.00
180	-580	10.80	10.80	10.80	0.00
180	-560	27.40	27.40	27.40	0.00
180	-540	23.60	23.60	23.60	0.00
180	-520	23.60	23.60	23.60	0.00
180	-500	23.20	23.20	23.20	0.00
180	-480	23.80	23.80	23.80	0.00
180	-460	29.80	29.80	29.80	0.00
180	-440	25.20	25.20	25.20	0.00
180	-420	29.20	29.20	29.20	0.00
180	-400	23.60	23.60	23.60	0.00

180	-380	27.20	27.20	27.20	0.00
180	-360	41.80	41.80	41.80	0.00
200	-380	29.60	29.60	29.60	0.00
200	-400	24.60	24.60	24.60	0.00
200	-420	25.00	25.00	25.00	0.00
200	-440	0.40	0.40	0.40	0.00
200	-460	34.80	34.80	34.80	0.00
200	-480	24.80	24.80	24.80	0.00
200	-500	22.20	22.20	22.20	0.00
200	-520	22.20	22.20	22.20	0.00
200	-540	23.60	23.60	23.60	0.00
200	-560	25.80	25.80	25.80	0.00
200	-580	28.20	28.20	28.20	0.00
200	-600	27.40	27.40	27.40	0.00
200	-620	27.00	27.00	27.00	0.00
200	-640	28.40	28.40	28.40	0.00
200	-660	30.40	30.40	30.40	0.00
200	-680	33.20	33.20	33.20	0.00
200	-700	30.00	30.00	30.00	0.00
200	-720	34.80	34.80	34.80	0.00
200	-740	26.60	26.60	26.60	0.00
200	-760	22.60	22.60	22.60	0.00
200	-780	19.20	19.20	19.20	0.00
220	-780	23.00	23.00	23.00	0.00
220	-760	24.20	24.20	24.20	0.00
220	-740	26.40	26.40	26.40	0.00
220	-720	28.00	28.00	28.00	0.00
220	-700	30.00	30.00	30.00	0.00
220	-680	36.60	36.60	36.60	0.00
220	-660	4.60	4.60	4.60	0.00
220	-640	35.00	35.00	35.00	0.00
220	-620	25.80	25.80	25.80	0.00
220	-600	26.20	26.20	26.20	0.00
220	-580	28.40	28.40	28.40	0.00
220	-560	25.00	25.00	25.00	0.00
220	-540	24.00	24.00	24.00	0.00
220	-520	22.60	22.60	22.60	0.00
220	-500	24.60	24.60	24.60	0.00
220	-480	24.40	24.40	24.40	0.00
220	-460	46.00	46.00	46.00	0.00
220	-440	24.20	24.20	24.20	0.00
220	-420	23.80	23.80	23.80	0.00
220	-400	31.60	31.60	31.60	0.00
220	-380	115.80	115.80	115.80	0.00
240	-380	215.40	215.40	215.40	0.00
240	-400	40.00	40.00	40.00	0.00
240	-420	23.60	23.60	23.60	0.00
240	-440	30.40	30.40	30.40	0.00
240	-460	64.00	64.00	64.00	0.00
240	-480	24.60	24.60	24.60	0.00
240	-500	23.80	23.80	23.80	0.00
240	-520	20.60	20.60	20.60	0.00
240	-540	22.60	22.60	22.60	0.00
240	-560	23.00	23.00	23.00	0.00
240	-580	23.00	23.00	23.00	0.00
240	-600	23.40	23.40	23.40	0.00

240	-620	1.00	1.00	1.00	0.00
240	-640	35.20	35.20	35.20	0.00
240	-660	29.60	29.60	29.60	0.00
240	-680	27.00	27.00	27.00	0.00
240	-700	27.20	27.20	27.20	0.00
240	-720	28.40	28.40	28.40	0.00
240	-740	26.60	26.60	26.60	0.00
240	-760	24.60	24.60	24.60	0.00
240	-780	22.60	22.60	22.60	0.00
260	-760	24.00	24.00	24.00	0.00
260	-740	25.00	25.00	25.00	0.00
260	-720	25.80	25.80	25.80	0.00
260	-700	25.80	25.80	25.80	0.00
260	-680	26.60	26.60	26.60	0.00
260	-660	25.40	25.40	25.40	0.00
260	-640	23.00	23.00	23.00	0.00
260	-620	21.60	21.60	21.60	0.00
260	-600	21.80	21.80	21.80	0.00
260	-580	19.60	19.60	19.60	0.00
260	-560	20.60	20.60	20.60	0.00
260	-540	21.00	21.00	21.00	0.00
260	-520	19.00	19.00	19.00	0.00
260	-500	22.40	22.40	22.40	0.00
260	-480	26.40	26.40	26.40	0.00
260	-460	19.20	19.20	19.20	0.00
260	-440	29.40	29.40	29.40	0.00
260	-420	24.20	24.20	24.20	0.00
260	-400	36.00	36.00	36.00	0.00
260	-380	399.80	399.80	399.80	0.00
280	-380	371.00	213.80	292.40	157.20
280	-400	46.40	43.00	44.70	3.40
280	-420	25.40	25.80	25.60	0.40
280	-440	28.00	28.20	28.10	0.20
280	-460	16.00	27.60	21.80	11.60
280	-480	30.00	28.20	29.10	1.80
280	-500	23.80	23.80	23.80	0.00
280	-520	22.80	22.20	22.50	0.60
280	-540	22.80	23.00	22.90	0.20
280	-560	23.00	22.40	22.70	0.60
280	-580	23.00	22.80	22.90	0.20
280	-600	21.20	21.40	21.30	0.20
280	-620	22.40	22.60	22.50	0.20
280	-640	24.00	24.20	24.10	0.20
280	-660	25.60	25.80	25.70	0.20
280	-680	26.80	27.00	26.90	0.20
280	-700	28.60	28.40	28.50	0.20
280	-720	25.80	25.60	25.70	0.20
280	-740	12.20	18.20	15.20	6.00
300	-720	22.80	23.00	22.90	0.20
300	-700	24.60	23.40	24.00	1.20
300	-680	26.00	25.40	25.70	0.60
300	-660	21.40	23.40	22.40	2.00
300	-640	20.00	21.20	20.60	1.20
300	-620	20.00	20.40	20.20	0.40
300	-600	19.20	19.40	19.30	0.20
300	-580	20.20	19.80	20.00	0.40

300	-560	19.20	18.80	19.00	0.40
300	-540	18.00	18.20	18.10	0.20
300	-520	19.20	19.40	19.30	0.20
300	-500	21.20	21.20	21.20	0.00
300	-480	35.00	32.80	33.90	2.20
300	-460	89.60	12.20	50.90	77.40
300	-440	25.00	25.00	25.00	0.00
300	-420	24.60	25.00	24.80	0.40
300	-400	46.80	41.20	44.00	5.60
300	-380	400.20	219.80	310.00	180.40
320	-380	400.60	400.20	400.40	0.40
320	-400	48.20	44.80	46.50	3.40
320	-420	25.00	25.40	25.20	0.40
320	-440	24.00	24.40	24.20	0.40
320	-460	65.40	55.60	60.50	9.80
320	-480	39.00	42.40	40.70	3.40
320	-500	23.20	23.00	23.10	0.20
320	-520	19.60	20.20	19.90	0.60
320	-540	19.60	19.60	19.60	0.00
320	-560	19.60	20.00	19.80	0.40
320	-580	19.00	19.40	19.20	0.40
320	-600	19.80	20.00	19.90	0.20
320	-620	20.80	20.80	20.80	0.00
320	-640	22.20	21.80	22.00	0.40
320	-660	23.40	23.60	23.50	0.20
320	-680	23.40	23.00	23.20	0.40
320	-700	23.00	22.60	22.80	0.20
340	-680	21.00	22.00	21.50	1.00
340	-660	21.00	21.40	21.20	0.40
340	-640	20.40	20.20	20.30	0.20
340	-620	19.80	20.20	20.00	0.40
340	-600	19.40	18.80	19.10	0.60
340	-580	18.60	18.40	18.50	0.20
340	-560	18.80	19.20	19.00	0.40
340	-540	17.80	18.40	18.10	0.60
340	-520	19.60	20.00	19.80	0.40
340	-500	23.40	24.00	23.70	0.60
340	-480	43.20	18.60	30.90	24.60
340	-460	41.20	45.00	43.10	3.80
340	-440	21.60	22.60	22.10	1.00
340	-420	22.80	23.60	23.20	0.80
340	-400	43.80	42.00	42.90	1.80
340	-380	281.20	150.60	215.90	130.60
360	-380	399.20	294.20	346.70	105.00
360	-400	38.40	37.00	37.70	1.40
360	-420	21.80	21.80	21.80	0.00
360	-440	20.00	20.40	20.20	0.40
360	-460	31.40	34.20	32.80	2.80
360	-480	15.00	16.20	15.60	1.20
360	-500	26.60	25.40	26.00	1.20
360	-520	21.00	20.80	20.90	0.20
360	-540	19.00	19.00	19.00	0.00
360	-560	19.00	19.40	19.20	0.40
360	-580	18.80	20.80	19.80	2.00
360	-600	19.80	20.60	20.20	0.80
360	-620	20.20	20.60	20.40	0.40

360	-640	19.80	19.80	19.80	0.00
360	-660	19.40	20.00	19.70	0.60
360	-680	19.20	19.00	19.10	0.20
380	-660	19.20	20.60	19.90	1.40
380	-640	18.80	19.00	18.90	0.20
380	-620	19.40	19.40	19.40	0.00
380	-600	20.60	20.60	20.60	0.00
380	-580	20.20	19.40	19.80	0.80
380	-560	19.20	19.20	19.20	0.00
380	-540	19.80	20.20	20.00	0.40
380	-520	21.40	21.80	21.60	0.40
380	-500	32.60	32.60	32.60	0.00
380	-480	57.00	6.80	31.90	50.20
380	-460	25.80	25.20	25.50	0.60
380	-440	18.80	19.00	18.90	0.20
380	-420	20.80	20.60	20.70	0.20
380	-400	37.20	36.60	36.90	0.60
380	-380	399.20	399.20	399.20	0.00
400	-380	399.00	399.00	399.00	0.00
400	-400	34.00	33.20	33.60	0.80
400	-420	19.60	19.80	19.70	0.20
400	-440	18.00	17.60	17.80	0.40
400	-460	23.20	24.20	23.70	1.00
400	-480	56.80	32.60	44.70	24.20
400	-500	36.40	40.00	38.20	3.60
400	-520	21.60	21.40	21.50	0.20
400	-540	20.40	20.20	20.30	0.20
400	-560	20.40	20.40	20.40	0.00
400	-580	20.80	20.60	20.70	0.20
400	-600	19.80	20.00	19.90	0.20
400	-620	19.60	19.40	19.50	0.20
400	-640	17.60	10.80	14.20	6.80
420	-620	18.60	19.00	18.80	0.40
420	-600	19.60	19.20	19.40	0.40
420	-580	20.20	20.00	20.10	0.20
420	-560	21.60	21.60	21.60	0.00
420	-540	21.20	21.60	21.40	0.40
420	-520	23.80	24.40	24.10	0.60
420	-500	32.40	10.20	21.30	22.20
420	-480	33.40	32.40	32.90	1.00
420	-460	22.60	22.60	22.60	0.00
420	-440	18.00	18.20	18.10	0.20
420	-420	20.80	20.80	20.80	0.00
420	-400	36.20	36.80	36.50	0.60
420	-380	399.00	399.20	399.10	0.20
440	-380	399.00	399.40	399.20	0.40
440	-400	40.00	38.20	39.10	1.80
440	-420	23.00	21.40	22.20	1.60
440	-440	19.80	19.20	19.50	0.60
440	-460	23.20	23.60	23.40	0.40
440	-480	30.80	32.20	31.50	1.40
440	-500	22.20	2.60	12.40	19.60
440	-520	28.00	27.20	27.60	0.80
440	-540	23.00	23.00	23.00	0.00
440	-560	22.60	22.80	22.70	0.20
440	-580	22.20	21.60	21.90	0.60

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440	-600	21.00	20.40	20.70	0.60
460	-600	24.60	23.00	23.80	1.60
460	-580	27.20	27.00	27.10	0.20
460	-560	27.60	27.80	27.70	0.20
460	-540	29.00	28.40	28.70	0.60
460	-520	35.80	37.60	36.70	1.80
460	-500	46.20	6.60	26.40	39.60
460	-480	33.20	35.60	34.40	2.40
460	-460	29.80	30.00	29.90	0.20
460	-440	25.20	26.00	25.60	0.80
460	-420	28.20	28.20	28.20	0.00
460	-400	47.20	47.20	47.20	0.00
460	-380	399.20	399.20	399.20	0.00
480	-380	399.20	399.40	399.30	0.20
480	-400	1.40	54.00	27.70	52.60
480	-420	2.20	24.80	13.50	22.60
480	-440	2.20	21.00	11.60	18.80
480	-460	21.60	40.60	31.10	19.00
480	-480	3.40	27.00	15.20	23.60
480	-500	33.40	32.60	33.00	0.80
480	-520	24.60	42.80	33.70	18.20
480	-540	9.60	27.20	18.40	17.60
480	-560	5.00	28.00	16.50	23.00
480	-580	0.80	39.00	19.90	38.20
500	-580	29.40	27.80	28.60	1.60
500	-560	32.40	32.40	32.40	0.00
500	-540	34.80	33.80	34.30	1.00
500	-520	43.80	29.60	36.70	14.20
500	-500	38.40	47.40	42.90	9.00
500	-480	40.60	39.80	40.20	0.80
500	-460	45.80	43.40	44.60	2.40
500	-440	34.40	34.00	34.20	0.40
500	-420	40.00	38.20	39.10	1.80
500	-400	61.20	60.80	61.00	0.40
500	-380	400.20	400.40	400.30	0.20
520	-380	291.20	243.20	267.20	48.00
520	-400	49.00	47.80	48.40	1.20
520	-420	31.60	30.00	30.80	1.60
520	-440	29.00	27.80	28.40	1.20
520	-460	35.40	36.00	35.70	0.60
520	-480	31.60	32.60	32.10	1.00
520	-500	39.20	40.40	39.80	1.20
520	-520	22.60	9.60	16.10	13.00
520	-540	27.40	26.60	27.00	0.80
520	-560	25.20	24.80	25.00	0.40
540	-560	22.60	24.40	23.50	1.80
540	-540	23.20	25.40	24.30	2.20
540	-520	20.00	17.60	18.80	2.40
540	-500	10.60	28.60	19.60	18.00
540	-480	9.60	23.00	16.30	13.40
540	-460	8.20	34.20	21.20	26.00
540	-440	7.20	29.00	18.10	21.80
540	-420	12.00	30.20	21.10	18.20
540	-400	24.20	52.80	38.50	28.60
540	-380	401.00	262.80	331.90	138.20
560	-380	400.40	400.40	400.40	0.00

560	-400	41.00	41.60	41.30	0.60
560	-420	25.40	25.20	25.30	0.20
560	-440	23.60	22.00	22.80	1.60
560	-460	29.80	30.80	30.30	1.00
560	-480	25.60	25.40	25.50	0.20
560	-500	27.00	26.00	26.50	1.00
560	-520	25.40	24.40	24.90	1.00
560	-540	24.80	20.80	22.80	4.00
580	-540	19.00	17.20	18.10	1.80
580	-520	24.00	24.00	24.00	0.00
580	-500	22.20	21.40	21.80	0.80
580	-480	21.60	22.40	22.00	0.80
580	-460	28.80	29.20	29.00	0.40
580	-440	21.80	21.60	21.70	0.20
580	-420	23.80	23.80	23.80	0.00
580	-400	39.00	40.60	39.80	1.60
580	-380	350.20	109.20	229.70	241.00
580	-360	39.80	40.40	40.10	0.60
580	-340	27.00	26.80	26.90	0.20
580	-320	21.60	21.20	21.40	0.40
580	-300	22.00	21.40	21.70	0.60
580	-280	25.20	24.80	25.00	0.40
580	-260	25.80	25.20	25.50	0.60
580	-240	31.60	30.00	30.80	1.60
580	-220	37.80	33.60	35.70	4.20
580	-200	33.60	33.20	33.40	0.40
580	-180	36.60	10.60	23.60	26.00
580	-160	30.60	30.60	30.60	0.00
580	-140	24.00	23.40	23.70	0.60
580	-120	23.00	22.20	22.60	0.80
580	-100	23.60	13.80	18.70	9.80
580	-80	23.00	23.80	23.40	0.80
580	-60	22.20	21.40	21.80	0.80
580	-40	23.00	22.40	22.70	0.60
580	-20	24.20	24.60	24.40	0.40
580	0	24.00	23.60	23.80	0.40
560	0	24.40	24.20	24.30	0.20
560	-20	24.80	24.60	24.70	0.20
560	-40	25.40	24.40	24.90	1.00
560	-60	37.60	34.00	35.80	3.60
560	-80	49.60	44.80	47.20	4.80
560	-100	55.60	28.00	41.80	27.60
560	-120	37.40	33.20	35.30	4.20
560	-140	29.20	25.80	27.50	3.40
560	-160	33.20	30.40	31.80	2.80
560	-180	45.00	39.40	42.20	5.60
560	-200	42.60	38.40	40.50	4.20
560	-220	131.40	125.40	128.40	6.00
560	-240	80.60	130.80	105.70	50.20
560	-260	40.60	39.20	39.90	1.40
560	-280	32.80	31.20	32.00	1.60
560	-300	28.80	28.60	28.70	0.20
560	-320	26.60	25.80	26.20	0.80
560	-340	34.00	33.80	33.90	0.20
560	-360	54.40	58.60	56.50	4.20
540	-360	125.20	121.80	123.50	3.40

540	-340	88.80	54.80	71.80	34.00
540	-320	47.20	85.20	66.20	38.00
540	-300	25.80	35.40	30.60	9.60
540	-280	72.80	58.80	65.80	14.00
540	-260	232.60	116.60	174.60	116.00
600	0	26.20	26.40	26.30	0.20
600	-20	6.00	18.60	12.30	12.60
600	-40	21.80	14.80	18.30	7.00
600	-60	21.80	22.00	21.90	0.20
600	-80	35.00	24.40	29.70	10.60
600	-100	45.60	27.00	36.30	18.60
600	-120	33.80	43.60	38.70	9.80
600	-140	15.00	23.00	19.00	8.00
600	-160	19.20	29.80	24.50	10.60
600	-180	27.80	9.60	18.70	18.20
600	-200	26.40	40.40	33.40	14.00
600	-220	31.40	31.00	31.20	0.40
600	-240	28.20	27.80	28.00	0.40
600	-260	24.60	24.60	24.60	0.00
600	-280	30.20	33.00	31.60	2.80
600	-300	23.80	25.60	24.70	1.80
600	-320	24.40	27.00	25.70	2.60
600	-340	30.40	33.20	31.80	2.80
600	-360	37.40	39.80	38.60	2.40
600	-380	227.40	72.20	149.80	155.20
600	-400	48.00	48.00	48.00	0.00
600	-420	29.20	32.40	30.80	3.20
600	-440	28.80	28.80	28.80	0.00
600	-460	33.60	33.00	33.30	0.60
600	-480	26.60	26.40	26.50	0.20
600	-500	21.40	21.20	21.30	0.20
600	-520	23.60	24.40	24.00	0.80
600	-540	21.20	22.40	21.80	1.20
560	0	25.00	25.00	25.00	0.00
540	0	26.20	26.00	26.10	0.20
520	0	27.00	26.40	26.70	0.60
500	0	28.00	27.60	27.80	0.40
480	0	28.80	27.80	28.30	1.00
460	0	28.60	28.00	28.30	0.60
440	0	29.80	29.00	29.40	0.80
420	0	29.80	29.20	29.50	0.60
400	0	31.00	30.80	30.90	0.20
380	0	31.60	31.20	31.40	0.40
360	0	42.80	39.80	41.30	3.00
340	0	33.40	33.20	33.30	0.20
320	0	33.60	33.40	33.50	0.20
300	0	33.60	32.80	33.20	0.80
280	0	32.80	32.60	32.70	0.20
260	0	33.40	32.60	33.00	0.80
240	0	33.00	32.60	32.80	0.40
220	0	31.40	30.20	30.80	1.20
200	0	30.60	30.40	30.50	0.20
180	0	30.20	29.20	29.70	1.00
160	0	27.00	26.40	26.70	0.60
140	0	24.80	20.40	22.60	4.40
120	0	24.80	24.80	24.80	0.00

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100	0	21.60	24.60	23.10	3.00
80	0	25.40	25.20	25.30	0.20
60	0	25.00	24.80	24.90	0.20
40	0	25.80	25.60	25.70	0.20
20	0	27.00	26.40	26.70	0.60
0	0	26.40	26.40	26.40	0.00
0	-20	26.60	26.40	26.50	0.20
20	-20	26.20	26.20	26.20	0.00
40	-20	24.40	25.60	25.00	1.20
60	-20	26.00	25.40	25.70	0.60
80	-20	27.20	27.00	27.10	0.20
100	-20	29.60	29.20	29.40	0.40
120	-20	30.20	29.40	29.80	0.80
140	-20	30.40	29.80	30.10	0.60
160	-20	34.80	33.60	34.20	1.20
180	-20	35.00	36.40	35.70	1.40
200	-20	36.40	37.20	36.80	0.80
220	-20	33.80	32.00	32.90	1.80
240	-20	33.80	33.80	33.80	0.00
260	-20	34.00	33.00	33.50	1.00
280	-20	34.60	33.80	34.20	0.80
300	-20	35.20	34.80	35.00	0.40
320	-20	35.80	35.40	35.60	0.40
340	-20	35.60	35.40	35.50	0.20
360	-20	35.60	35.40	35.50	0.20
380	-20	35.00	35.00	35.00	0.00
400	-20	33.00	33.40	33.20	0.40
420	-20	32.60	32.80	32.70	0.20
440	-20	32.80	32.80	32.80	0.00
460	-20	15.00	45.00	30.00	30.00
480	-20	33.20	33.00	33.10	0.20
500	-20	31.20	31.80	31.50	0.60
520	-20	30.40	30.20	30.30	0.20
540	-20	27.20	27.80	27.50	0.60
560	-20	25.00	25.00	25.00	0.00
560	-40	26.20	24.60	25.40	1.60
540	-40	52.80	76.60	64.70	23.80
520	-40	79.40	103.60	91.50	24.20
500	-40	105.60	149.00	127.30	43.40
480	-40	103.00	119.20	111.10	16.20
460	-40	127.60	142.20	134.90	14.60
440	-40	124.80	137.80	131.30	13.00
420	-40	88.80	101.00	94.90	12.20
400	-40	90.40	117.20	103.80	26.80
380	-40	86.40	101.80	94.10	15.40
360	-40	99.80	139.20	119.50	39.40
340	-40	93.40	112.20	102.80	18.80
320	-40	93.60	113.40	103.50	19.80
300	-40	89.60	106.20	97.90	16.60
280	-40	90.60	102.60	96.60	12.00
260	-40	96.40	105.20	100.80	8.80
240	-40	97.60	105.80	101.70	8.20
220	-40	87.40	101.40	94.40	14.00
200	-40	94.80	135.40	115.10	40.60
180	-40	82.60	101.40	92.00	18.80
160	-40	86.80	102.20	94.50	15.40

140	-40	67.40	78.80	73.10	11.40
120	-40	80.80	90.80	85.80	10.00
100	-40	80.40	101.00	90.70	20.60
80	-40	67.60	81.60	74.60	14.00
60	-40	48.40	58.40	53.40	10.00
40	-40	28.40	29.00	28.70	0.60
20	-40	26.40	26.20	26.30	0.20
0	-40	26.80	26.40	26.60	0.40

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
0.0	0.0	58854.9	58833.0	21.8
-5.0	0.0	58755.4	58757.8	-2.4
-10.0	0.0	58778.1	58773.6	4.5
-15.0	0.0	58797.8	58790.8	7.1
-20.0	0.0	58799.5	58792.5	7.0
-25.0	0.0	58803.0	58793.1	9.9
-30.0	0.0	58798.3	58793.0	5.3
-35.0	0.0	58813.8	58806.0	7.9
-40.0	0.0	58816.6	58801.0	15.6
-45.0	0.0	58831.2	58826.5	4.7
-45.0	5.0	58721.0	58741.0	-19.9
-40.0	5.0	58779.2	58771.4	7.9
-35.0	5.0	58783.0	58772.6	10.4
-30.0	5.0	58776.8	58767.3	9.5
-25.0	5.0	58763.5	58759.4	4.1
-20.0	5.0	58776.3	58771.0	5.2
-15.0	5.0	58769.5	58764.7	4.8
-10.0	5.0	58762.3	58757.9	4.4
-5.0	5.0	58759.8	58756.4	3.4
0.0	5.0	58831.4	58812.4	19.0
0.0	10.0	58860.7	58827.7	33.1
-5.0	10.0	58773.7	58769.7	4.0
-10.0	10.0	58797.1	58783.2	14.0
-15.0	10.0	58796.1	58786.3	9.8
-20.0	10.0	58766.0	58764.9	1.1
-25.0	10.0	58753.4	58753.9	-0.4
-30.0	10.0	58778.9	58771.9	7.0
-35.0	10.0	58793.1	58784.1	9.1
-40.0	10.0	58770.0	58768.1	1.9
-45.0	10.0	58721.5	58733.3	-11.8
-50.0	15.0	58815.2	58801.6	13.6
-45.0	15.0	58756.6	58752.7	3.9
-40.0	15.0	58752.5	58751.4	1.1
-35.0	15.0	58769.3	58762.0	7.3
-30.0	15.0	58763.7	58753.9	9.8
-25.0	15.0	58742.4	58739.2	3.2
-20.0	15.0	58759.9	58755.3	4.6
-15.0	15.0	58781.4	58773.1	8.3
-10.0	15.0	58773.5	58764.6	8.8
-5.0	15.0	58734.5	58741.2	-6.8
0.0	15.0	58825.3	58805.1	20.3
0.0	20.0	58825.8	58802.3	23.5
-5.0	20.0	58732.3	58734.4	-2.1
-10.0	20.0	58763.2	58751.9	11.3
-15.0	20.0	58780.9	58763.0	17.8
-20.0	20.0	58740.0	58739.6	0.4
-25.0	20.0	58722.3	58723.0	-0.7
-30.0	20.0	58740.6	58737.7	2.9
-35.0	20.0	58746.2	58744.4	1.8
-40.0	20.0	58756.0	58754.1	1.8

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
-45.0	20.0	58761.4	58762.1	-0.7
-50.0	20.0	58826.3	58817.3	9.0
-50.0	25.0	58815.8	58812.4	3.4
-45.0	25.0	58772.4	58763.7	8.7
-40.0	25.0	58764.5	58754.9	9.6
-35.0	25.0	58743.0	58737.5	5.4
-30.0	25.0	58730.2	58723.2	7.0
-25.0	25.0	58716.9	58716.1	0.8
-20.0	25.0	58754.5	58744.1	10.3
-15.0	25.0	58757.7	58747.9	9.8
-10.0	25.0	58750.6	58741.2	9.4
-5.0	25.0	58706.5	58715.8	-9.4
0.0	25.0	58794.4	58779.1	15.3
0.0	30.0	58782.5	58765.1	17.4
-5.0	30.0	58702.4	58704.7	-2.3
-10.0	30.0	58724.6	58716.7	7.9
-15.0	30.0	58731.7	58720.2	11.5
-20.0	30.0	58719.7	58713.7	6.1
-25.0	30.0	58699.3	58698.1	1.3
-30.0	30.0	58692.9	58694.5	-1.6
-35.0	30.0	58711.3	58709.6	1.8
-40.0	30.0	58743.3	58734.3	9.1
-45.0	30.0	58762.5	58761.9	0.7
-50.0	30.0	58832.4	58825.8	6.6
-50.0	35.0	58831.0	58828.1	2.9
-45.0	35.0	58789.8	58771.4	18.3
-40.0	35.0	58738.5	58727.8	10.7
-35.0	35.0	58708.9	58702.2	6.6
-30.0	35.0	58705.3	58695.2	10.1
-25.0	35.0	58695.3	58689.3	6.0
-20.0	35.0	58693.2	58686.4	6.9
-15.0	35.0	58716.5	58707.9	8.6
-10.0	35.0	58722.2	58712.2	10.1
-5.0	35.0	58705.9	58705.0	0.9
0.0	35.0	58783.6	58762.6	21.1
0.0	40.0	58773.4	58751.5	21.9
-5.0	40.0	58677.4	58676.4	1.0
-10.0	40.0	58693.9	58683.0	10.8
-15.0	40.0	58695.0	58681.7	13.3
-20.0	40.0	58650.9	58654.7	-3.7
-25.0	40.0	58651.3	58655.3	-4.0
-30.0	40.0	58676.2	58675.5	0.7
-35.0	40.0	58703.7	58697.0	6.7
-40.0	40.0	58715.5	58711.1	4.5
-45.0	40.0	58752.4	58745.6	6.8
-50.0	40.0	58781.8	58783.6	-1.8
-55.0	40.0	58891.6	58883.5	8.1
-55.0	45.0	58796.3	58807.6	-11.3
-50.0	45.0	58718.4	58724.7	-6.3
-45.0	45.0	58684.1	58688.2	-4.1

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
-40.0	45.0	58658.3	58665.8	-7.5
-35.0	45.0	58690.7	58685.0	5.7
-30.0	45.0	58686.1	58678.4	7.7
-25.0	45.0	58655.5	58655.9	-0.4
-20.0	45.0	58652.3	58649.9	2.4
-15.0	45.0	58660.7	58659.4	1.3
-10.0	45.0	58654.0	58655.2	-1.2
-5.0	45.0	58647.9	58646.6	1.4
0.0	45.0	58745.3	58727.6	17.7
0.0	50.0	58757.0	58732.0	25.0
-5.0	50.0	58645.0	58648.9	-3.9
-10.0	50.0	58673.2	58665.6	7.6
-15.0	50.0	58691.0	58677.4	13.6
-20.0	50.0	58666.1	58664.0	2.2
-25.0	50.0	58684.9	58676.3	8.6
-30.0	50.0	58707.7	58692.2	15.6
-35.0	50.0	58688.5	58678.2	10.3
-40.0	50.0	58654.1	58657.1	-3.0
-45.0	50.0	58684.7	58681.2	3.5
-50.0	50.0	58724.4	58718.9	5.5
-55.0	50.0	58777.0	58781.8	-4.8
-60.0	55.0	58873.2	58842.6	30.6
-55.0	55.0	58733.2	58736.6	-3.4
-50.0	55.0	58711.6	58699.2	12.4
-45.0	55.0	58675.1	58663.3	11.8
-40.0	55.0	58628.5	58628.9	-0.4
-35.0	55.0	58662.0	58651.3	10.7
-30.0	55.0	58678.4	58666.5	11.9
-25.0	55.0	58686.9	58673.2	13.7
-20.0	55.0	58693.7	58681.3	12.4
-15.0	55.0	58708.0	58696.6	11.4
-10.0	55.0	58702.5	58687.9	14.6
-5.0	55.0	58656.0	58652.1	3.9
0.0	55.0	58721.2	58707.5	13.7
0.0	60.0	58724.0	58702.6	21.4
-5.0	60.0	58649.8	58648.4	1.4
-10.0	60.0	58722.7	58706.6	16.1
-15.0	60.0	58832.8	58775.2	57.7
-20.0	60.0	58692.0	58680.2	11.8
-25.0	60.0	58664.1	58658.9	5.2
-30.0	60.0	58651.9	58646.8	5.1
-35.0	60.0	58646.3	58641.4	4.9
-40.0	60.0	58614.5	58620.2	-5.7
-45.0	60.0	58640.3	58639.2	1.0
-50.0	60.0	58669.3	58662.8	6.5
-55.0	60.0	58647.6	58663.8	-16.2
-60.0	60.0	58776.4	58768.0	8.4
-60.0	65.0	58675.6	58682.1	-6.5
-55.0	65.0	58575.3	58599.1	-23.7
-50.0	65.0	58642.6	58639.4	3.2

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
....	....	....	....	....
-45.0	65.0	58643.2	58640.5	2.6
-40.0	65.0	58649.2	58645.0	4.2
-35.0	65.0	58641.1	58640.1	1.0
-30.0	65.0	58641.4	58641.5	-0.1
-25.0	65.0	58651.2	58647.6	3.6
-20.0	65.0	58662.3	58655.2	7.1
-15.0	65.0	58559.3	58607.4	-48.2
-10.0	65.0	58683.0	58667.4	15.6
-5.0	65.0	58679.1	58673.4	5.8
0.0	65.0	58701.3	58693.2	8.2
0.0	70.0	58767.0	58738.5	28.5
-5.0	70.0	58706.0	58694.6	11.5
-10.0	70.0	58696.3	58688.4	7.8
-15.0	70.0	58678.7	58674.9	3.8
-20.0	70.0	58673.1	58668.8	4.3
-25.0	70.0	58688.4	58679.4	9.0
-30.0	70.0	58669.3	58667.1	2.2
-35.0	70.0	58683.6	58677.1	6.5
-40.0	70.0	58690.9	58681.1	9.7
-45.0	70.0	58688.0	58678.0	10.0
-50.0	70.0	58658.1	58652.0	6.1
-55.0	70.0	58635.3	58642.0	-6.7
-60.0	70.0	58690.1	58690.0	0.1
-60.0	75.0	58764.3	58743.1	21.1
-55.0	75.0	58702.9	58698.6	4.2
-50.0	75.0	58675.8	58679.9	-4.1
-45.0	75.0	58706.4	58696.2	10.2
-40.0	75.0	58735.2	58717.7	17.5
-35.0	75.0	58728.2	58714.1	14.2
-30.0	75.0	58746.1	58725.8	20.3
-25.0	75.0	58726.3	58710.8	15.5
-20.0	75.0	58645.0	58661.8	-16.8
-15.0	75.0	58718.5	58702.3	16.2
-10.0	75.0	58739.8	58712.9	27.0
-5.0	75.0	58697.4	58680.9	16.5
0.0	75.0	58702.0	58687.6	14.4
0.0	80.0	58589.7	58608.0	-18.4
-5.0	80.0	58635.9	58642.0	-6.1
-10.0	80.0	58718.0	58700.1	17.9
-15.0	80.0	58731.3	58717.9	13.4
-20.0	80.0	58721.7	58708.1	13.6
-25.0	80.0	58718.1	58711.8	6.3
-30.0	80.0	58754.4	58737.1	17.3
-35.0	80.0	58760.6	58743.2	17.3
-40.0	80.0	58774.9	58753.1	21.8
-45.0	80.0	58745.4	58737.0	8.4
-50.0	80.0	58742.4	58730.2	12.1
-55.0	80.0	58756.5	58749.5	7.0
-60.0	80.0	58812.5	58794.6	17.9
-65.0	85.0	58853.6	58831.0	22.6

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
-60.0	85.0	58800.9	58787.6	13.3
-55.0	85.0	58764.6	58753.7	10.9
-50.0	85.0	58754.2	58740.4	13.9
-45.0	85.0	58738.6	58735.0	3.6
-40.0	85.0	58757.5	58747.3	10.2
-35.0	85.0	58767.3	58749.9	17.5
-30.0	85.0	58726.1	58729.5	-3.4
-25.0	85.0	58715.0	58711.1	4.0
-20.0	85.0	58705.7	58699.6	6.1
-15.0	85.0	58726.2	58708.5	17.7
-10.0	85.0	58707.0	58701.6	5.4
-5.0	85.0	58702.9	58695.0	8.0
0.0	85.0	58736.8	58713.7	23.1
0.0	90.0	58783.2	58754.9	28.3
-5.0	90.0	58746.2	58725.0	21.2
-10.0	90.0	58723.6	58707.8	15.8
-15.0	90.0	58679.9	58683.8	-3.8
-20.0	90.0	58738.9	58716.6	22.3
-25.0	90.0	58723.6	58713.7	9.8
-30.0	90.0	58758.2	58735.8	22.4
-35.0	90.0	58775.2	58755.4	19.8
-40.0	90.0	58769.5	58753.7	15.8
-45.0	90.0	58762.1	58747.1	15.0
-50.0	90.0	58767.6	58747.4	20.2
-55.0	90.0	58762.8	58753.6	9.1
-60.0	90.0	58818.1	58806.2	11.9
-65.0	90.0	58869.7	58849.4	20.3
-65.0	95.0	58897.0	58852.8	44.2
-60.0	95.0	58815.0	58791.8	23.2
-55.0	95.0	58772.6	58753.1	19.5
-50.0	95.0	58753.9	58743.0	10.9
-45.0	95.0	58796.9	58762.8	34.2
-40.0	95.0	58549.6	58648.3	-98.8
-35.0	95.0	58742.4	58729.0	13.4
-30.0	95.0	58741.6	58724.0	17.6
-25.0	95.0	58728.9	58721.3	7.6
-20.0	95.0	58668.4	58670.0	-1.6
-15.0	95.0	58675.9	58674.4	1.5
-10.0	95.0	58722.1	58703.6	18.4
-5.0	95.0	58715.6	58712.4	3.1
0.0	95.0	58798.7	58768.9	29.8
0.0	100.0	58766.3	58738.7	27.7
-5.0	100.0	58698.6	58693.6	5.1
-10.0	100.0	58731.4	58709.2	22.2
-15.0	100.0	58779.5	58681.2	98.2
-20.0	100.0	58616.5	58638.6	-22.1
-25.0	100.0	58645.5	58671.1	-25.6
-30.0	100.0	58650.6	58678.1	-27.5
-35.0	100.0	58729.4	58707.1	22.3
-40.0	100.0	58753.6	58729.8	23.8

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
....	....	....	....	....
-45.0	100.0	58705.8	58709.0	-3.2
-50.0	100.0	58715.7	58714.3	1.4
-55.0	100.0	58762.3	58744.9	17.4
-60.0	100.0	58729.0	58733.3	-4.3
-65.0	100.0	58805.6	58790.1	15.5
-70.0	100.0	58826.0	58802.8	23.1
-70.0	105.0	58791.2	58767.8	23.4
-65.0	105.0	58765.3	58747.3	18.0
-60.0	105.0	58715.1	58712.7	2.4
-55.0	105.0	58752.6	58734.0	18.6
-50.0	105.0	58723.1	58713.6	9.4
-45.0	105.0	58724.3	58714.3	10.0
-40.0	105.0	58717.4	58705.8	11.6
-35.0	105.0	58649.7	58658.5	-8.8
-30.0	105.0	59027.5	58867.5	160.0
-25.0	105.0	58745.4	58737.2	8.2
-20.0	105.0	58465.4	58580.6	-115.2
-15.0	105.0	58609.9	58619.2	-9.3
-10.0	105.0	58685.8	58675.5	10.3
-5.0	105.0	58685.2	58675.5	9.6
0.0	105.0	58715.4	58699.3	16.1
0.0	110.0	58691.4	58673.1	18.3
-5.0	110.0	58708.4	58682.0	26.3
-10.0	110.0	58675.1	58665.4	9.7
-15.0	110.0	58642.6	58640.3	2.3
-20.0	110.0	58693.9	58665.7	28.3
-25.0	110.0	58821.2	58746.0	75.2
-30.0	110.0	58756.0	58745.4	10.6
-35.0	110.0	58746.2	58717.9	28.3
-40.0	110.0	58696.1	58691.8	4.2
-45.0	110.0	58735.4	58733.0	2.4
-50.0	110.0	58715.5	58714.9	0.7
-55.0	110.0	58712.2	58709.7	2.5
-60.0	110.0	58726.5	58723.8	2.7
-65.0	110.0	58727.4	58730.4	-3.0
-70.0	110.0	58752.5	58734.8	17.8
-75.0	115.0	58612.7	58623.7	-11.1
-70.0	115.0	58532.1	58566.0	-33.9
-65.0	115.0	58541.2	58572.4	-31.3
-60.0	115.0	58594.6	58607.1	-12.5
-55.0	115.0	58616.3	58621.8	-5.5
-50.0	115.0	58652.6	58645.4	7.2
-45.0	115.0	58670.3	58657.7	12.6
-40.0	115.0	58687.6	58677.7	9.9
-35.0	115.0	58671.7	58667.3	4.3
-30.0	115.0	58656.2	58656.3	0.0
-25.0	115.0	58654.0	58647.6	6.4
-20.0	115.0	58549.1	58590.5	-41.4
-15.0	115.0	58670.4	58653.6	16.8
-10.0	115.0	58615.6	58609.6	6.0

EAST COORDINATE	NORTH COORDINATE	LOWER INTENSITY	UPPER INTENSITY	GRADIENT
-5.0	115.0	58563.1	58572.7	-9.6
0.0	115.0	58557.9	58562.3	-4.5
0.0	120.0	58098.7	58225.7	-127.0
-5.0	120.0	58294.6	58364.0	-69.4
-10.0	120.0	58380.6	58437.0	-56.5
-15.0	120.0	58451.0	58488.1	-37.1
-20.0	120.0	58514.1	58534.4	-20.3
-25.0	120.0	58637.1	58603.9	33.3
-30.0	120.0	58476.5	58513.4	-36.9
-35.0	120.0	58465.8	58502.9	-37.1
-40.0	120.0	58474.5	58502.1	-27.6
-45.0	120.0	58486.1	58512.5	-26.4
-50.0	120.0	58465.8	58508.3	-42.6
-55.0	120.0	58417.0	58470.9	-53.9
-60.0	120.0	58457.5	58490.0	-32.5
-65.0	120.0	58398.0	58452.4	-54.4
-70.0	120.0	58370.8	58420.2	-49.4

APPENDIX M

DAMES & MOORE TECHNICAL OPERATIONS PLAN (TOP) AND HEALTH AND SAFETY PLAN

INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 2

TECHNICAL OPERATIONS PLAN

FOR

DULUTH INTERNATIONAL AIRPORT, MINNESOTA

TACTICAL AIR COMMAND
AND
AIR NATIONAL GUARD

PREPARED FOR

UNITED STATES AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY (OEHL)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

NOVEMBER 21, 1986

INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 2

TECHNICAL OPERATIONS PLAN

FOR

DULUTH INTERNATIONAL AIRPORT, MINNESOTA

TACTICAL AIR COMMAND
AND
AIR NATIONAL GUARD

NOVEMBER 21, 1986

PREPARED BY

DAMES & MOORE
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CONTRACT NO. F33615-83-D-4002, Order 0038

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BROOKS AIR FORCE BASE, TEXAS 78235-5501

D&M Job No. 01016-267-07

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TECHNICAL OPERATIONS PLAN
INSTALLATION RESTORATION PROGRAM, PHASE II, STAGE 2
DULUTH INTERNATIONAL AIRPORT, MINNESOTA

1.0 INTRODUCTION

This Technical Operations Plan (TOP) describes the methods and procedures that will be used to accomplish the objectives of the Phase II, Stage 2 field investigation of the United States Air Force (USAF) Installation Restoration Program (IRP) for Duluth International Airport (IAP), Minnesota. The IRP is a nationwide effort intended to identify, evaluate the extent of, and mitigate environmental contamination potentially induced by the mobilization and migration of hazardous or toxic chemicals from past disposal or other handling practices at USAF facilities. On the basis of the findings of the Phase I Records Search (Engineering-Science, 1982) and the Phase II, Stage 1 Problem Confirmation Study (Roy F. Weston, Inc., 1984), the USAF Occupational and Environmental Health Laboratory (OEHL) retained Dames & Moore under Contract No. F33615-83-D-4002, Order No. 0038, to conduct the Phase II, Stage 2 study at Duluth IAP.

The Phase I and Phase II, Stage 1 contractors' reports were carefully reviewed, and their recommendations for the Phase II, Stage 2 program were considered. A site visit/briefing at Duluth IAP was undertaken on May 15, 1985, to discuss and inspect the sites to be investigated during the Phase II, Stage 2 study. A presurvey was conducted to determine the approach to be used in accomplishing the requirements of Phase II, Stage 2 of the IRP. Additionally, written comments provided by U.S. Environmental Protection Agency Region V (USEPA, 1985) and the Minnesota Pollution Control Agency (MPCA, 1985) generated by review of the above cited reports were discussed. Attendees at the meeting included:

Col. Jerry P. Dougherty	HQ TAC/SGPB, Langley AFB, VA
Lt. Col. Edward Barnes	USAF OEHL/TS, Brooks AFB, TX
Lt. Col. Curtis P. Jones	148 CSS/CC MN ANG, Duluth IAP, MN
Maj. Joel D. Manns	Base Civil Engineering ANG Duluth IAP, MN
MSgt. Merlin O. Carlson	148 TAC Clinic/SGPB, Duluth IAP, MN
Mr. Larry Livesay	MPCA, Roseville, MN
Mr. Tim Musick	MPCA, Duluth, MN
Dr. Kenneth J. Stimpfl	Dames & Moore, Park Ridge, IL

1.1 PURPOSE AND SCOPE

The purpose of the TOP is to detail the methods and procedures that will be used to accomplish the tasks defined during the Stage 2 Investigation at Duluth IAP.

Guidelines of the MPCA, Occupational Safety and Health Administration (OSHA), USEPA, and USAF, as well as previous investigations at Duluth IAP, were reviewed to select the methods that would be most appropriate for this investigation. The TOP is designed primarily to give guidance to personnel in the field and to ensure that standard methods of investigation are used. However, not all field problems can be anticipated, and the field personnel must exercise professional judgment when applying the guidelines.

The purpose of the Phase II, Stage 2 investigation at Duluth IAP, as described in this TOP, is to conduct a field investigation, with subsequent laboratory analysis of collected samples, data interpretation, and reporting, to accomplish the following objectives:

- Confirm the presence or absence of contamination within the specified areas of investigation;
- Determine the magnitude of contamination and the potential for and rate of migration of those contaminants in various environmental media;
- Identify potential environmental and health risk consequences of migrating pollutants based on state or federal standards for those contaminants; and
- Delineate additional investigations required beyond this stage to reach the Phase II objectives.

The Phase II, Stage 2 effort at Duluth IAP will entail a follow-up investigation of sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites included in this study are identified in Table 1-1 and can be located in Figure 1-1. The sites to receive follow-up investigative work are Goose Dump 1, the Fire Training Areas, DPDO Storage Area "C", and the Tank Farm Area. The two fire training areas (FT-1 and FT-2) have been consolidated into one site.

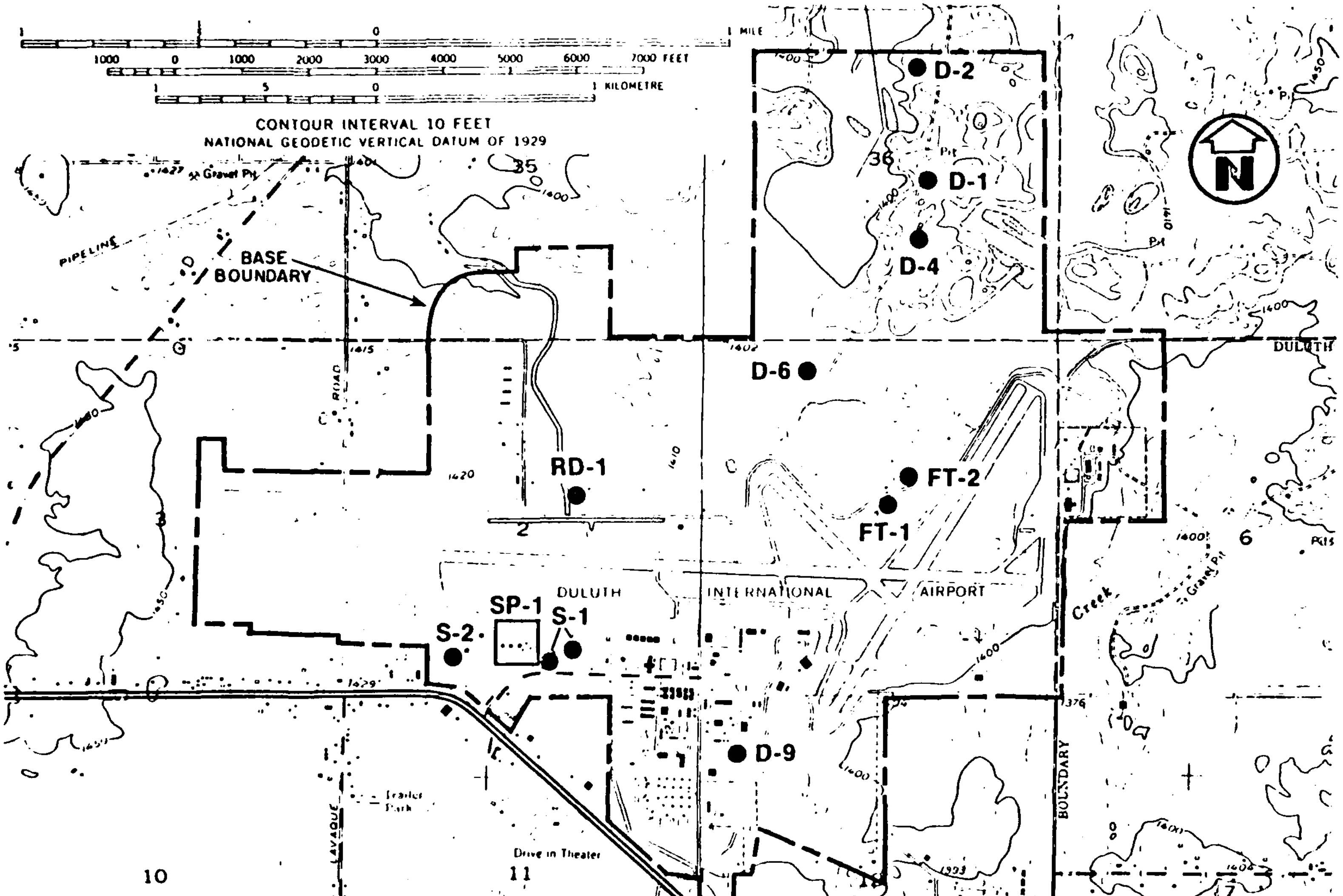
The recommended program requires the installation of 30 additional ground water monitor wells and 19 soil borings. Sampling for chemical constituent analysis will be conducted at the 30 new monitor wells and 10 existing monitor wells for the parameters listed in Table 1-2. In addition, geophysical surveys will be performed using a metal detector and a magnetometer at Site 4 to locate underground pipes; at Site 6 to locate the dump site drums; and at Sites 7, 9, and 10 to accurately define the site boundaries. At Site 4, an electromagnetic survey will also be performed to identify leak sites from the underground pipes. A detailed study of the aerial photographs will be performed at Sites 6, 7, 9, and 10 to accurately locate the contaminated areas.

TABLE 1-1

LISTING OF SITES

Site Number	Phase I Number	Site Description
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

Note: ANG = Air National Guard sites,
TAC = Tactical Air Command sites.



SOURCE: WESTON, 1984
MODIFIED FROM: USGS 7.5 MIN. TOPO. MAP, DULUTH HEIGHTS, MN, 1953, PHOTO REV. 1969, 1975

FIGURE 1-1
LOCATIONS OF ALL POTENTIAL SOURCES OF CONTAMINATION RECEIVING PHASE I HARM SCORE RANKINGS

Dames & Moore

TABLE 1-2

ANALYTICAL PROGRAM

WATER[a]

PARAMETER	METHOD/ EXTRACTION METHOD	SITE 1 D-1	SITE 2 FT-1, FT-2	SITE 3 SP-2	SITE 4 SP-1	SITE 5 D-4	SITE 6 D-2	SITE 7 D-6	SITE 8 S-1	SITE 9 D-9	SITE 10 PD-1	NUMBER OF SAMPLES	QC[b]	TOTAL SAMPLES
Purgeable Halocarbons	E 601	6	14	7	12	6	-	4	5	-	-	54	9	93[c]
Purgeable Aromatics	E 602	6	14	7	12	6	-	4	5	-	-	54	9	93[c]
Oil and Grease (IR)	E 413.2	6	14	7	12	6	-	4	5	-	-	54	9	63
Arsenic	E 206.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Barium	E 208.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Cadmium	E 213.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Chromium	E 218.1	6	-	7	-	6	-	4	5	-	-	28	5	33
Lead	E 239.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Mercury	E 245.1	6	-	7	-	6	-	4	5	-	-	28	5	33
Selenium	E 270.3	6	-	7	-	6	-	4	5	-	-	28	5	33
Silver	E 272.2	6	-	7	-	6	-	4	5	-	-	28	5	33
Pesticides/ PCBs	E 608	6	-	7	-	6	-	4	5	-	-	28	5	49[c]
Herbicides	E 615	6	-	7	-	6	-	4	5	-	-	28	5	49[c]
Phenol	E 420.2	6	14	7	-	6	-	4	5	-	-	42	8	50
Acetone	ASTM D 3695-82	-	-	-	-	-	-	-	-	1	-	1	1	2
Picric Acid	USATHAMA 2B	-	-	-	-	-	-	-	-	1	-	1	1	2
Gross Alpha	Standard Methods, 16th ed., 703	-	-	-	-	-	-	-	-	-	3	3	1	4
Gross Beta	Standard Methods, 16th ed., 703	-	-	-	-	-	-	-	-	-	3	3	1	4
Radium-226	E600/4-80-032, 903.0	-	-	-	-	-	-	-	-	-	3	3	1	4
Radium-228	E600/4-80-032, 904.0	-	-	-	-	-	-	-	-	-	3	3	1	4

SOIL[d]

PARAMETER	METHOD/ EXTRACTION METHOD	SITE 1 D-1	SITE 2 FT-1, FT-2	SITE 3 SP-2	SITE 4 SP-1	SITE 5 D-4	SITE 6 D-2	SITE 7 D-6	SITE 8 S-1	SITE 9 D-9	SITE 10 PD-1	NUMBER OF SAMPLES	QC[b]	TOTAL SAMPLES
Purgeable Halocarbons	SW 8010[e]	9	17	16	23	8	4	8	11	-	-	96	15	164[c]
Purgeable Aromatics	SW 8020[e]	9	17	16	23	8	4	8	11	-	-	96	15	164[c]
Oil and Grease (IR)	SW 3550 and 413.2	9	17	16	23	8	4	8	11	-	-	96	15	111
Arsenic	SW 3050 and 7060	9	-	16	-	8	-	8	11	-	-	52	9	61
Barium	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Cadmium	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Chromium	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Lead	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Mercury	SW 7471	9	-	16	-	8	-	8	11	-	-	52	9	61
Selenium	SW 3050 and 7740	9	-	16	-	8	-	8	11	-	-	52	9	61
Silver	SW 3050 and 6010	9	-	16	-	8	-	8	11	-	-	52	9	61
Pesticides/ PCBs	SW 3550 and 8080	9	-	16	-	8	-	8	11	-	-	52	9	90[c]
Herbicides	SW 8150	9	-	16	-	8	-	8	11	-	-	52	9	90[c]
Phenol	E 420.2 modified	9	17	16	-	8	-	8	11	-	-	69	11	80
Acetone	Water extr. and ASTM D 3695-82	-	-	-	-	-	-	-	-	2	-	2	1	3
Picric Acid	USATHAMA 2C	-	-	-	-	-	-	-	-	2	-	2	1	3
Ethylene Glycol	NIOSH P & CAM 338 modified for soil	-	-	-	-	-	4	-	-	-	-	4	1	5
Soil Moisture Determination		9	17	16	23	8	4	8	11	2	-	98	15	113
EP Toxicity[f]	40 CFR 261.24	SAMPLES AS NEEDED AND NOT SPECIFIED BY SITE (TOTAL NUMBER = 15)										15	2	17
Ignitability[f]	40 CFR 261.21	SAMPLES AS NEEDED AND NOT SPECIFIED BY SITE (TOTAL NUMBER = 15)										15	2	17

The methods cited in the analysis protocols come from the following sources:

"E" Methods (Water Only) — E 100 through E 500: Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020 (USEPA, 1983).
E 600: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (USEPA, 49 FR 209, 10/26/84).

"SW" Methods (Water & Soil) — Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd ed. (USEPA, 1984).

[a] Includes both well and surface water samples.

[b] QC field sample includes duplicates, trip blanks, and rinse (field) blanks.

[c] Total number of samples includes second column confirmation on 50% of samples (to include field QC samples).

[d] Includes both borehole and sediment samples.

[e] Extraction included in method.

[f] Samples to be analyzed to be collected from soil cuttings.

1.2 INSTALLATION DESCRIPTION AND HISTORY

1.2.1 Location and Host Organizations

The Duluth IAP is located in St. Louis County, Minnesota, approximately 7 miles northwest of the city of Duluth, at the western end of Lake Superior. Opened in 1948 as the Williamson-Johnson Airport, this 1995-acre installation has been jointly operated by the USAF, the Minnesota Air National Guard (MANG), and the City of Duluth. Duluth IAP has hosted a variety of operational USAF activities during the period 1948 through 1981. Although USAF operational missions were terminated at Duluth IAP in December 1981, this Tactical Air Command (TAC) installation continues as a site of both commercial civilian and ANG activities. The host organization is the 148th Tactical Reconnaissance Group (MANG).

1.2.2 Hydrogeology

Duluth IAP is located on the Superior Upland, an extension of the Laurentian Upland of the Canadian Shield. The synclinal Lake Superior basin is a major structural feature of this region.

At Duluth IAP, the bedrock is composed of the Duluth Complex, consisting of Precambrian gabbro and several other igneous intrusive rock types. The Duluth gabbro extends beneath the Lake Superior basin in the form of a lopolith, a large lenticular centrally sunken intrusive mass. At Duluth, the lopolith is 12,000 feet thick (Thornbury, 1965). The Duluth Complex is located on the western limb of the Superior Syncline, the axis of which corresponds roughly to the axis of Lake Superior (Weston, 1984).

Surface deposits at Duluth IAP consist of Pleistocene age Late Wisconsinan glacial deposits. Topography in the vicinity of Duluth IAP reflects its recent glacial history as poorly defined deranged drainage dominates; numerous shallow lakes, swamps and bogs exist; and irregular low relief typifies the area.

The naturally occurring unconsolidated surface deposits at the base were glacial outwash. The Mille Lacs-Highland Moraine Association, a sandy, stony till, is present as ground moraine to the southeast of the base and end moraine to the northwest of the base (Hobbs and Goebel, 1982). Surface deposits have been modified at the base due to earthmoving activities. All four sites investigated during the Phase II, Stage 1 effort are located on structural fill or otherwise disturbed ground (Weston, 1984). Unconsolidated sediments are believed to range in thickness from 10 to 60 feet at Duluth IAP (Engineering-Science, 1982).

Surface elevations at Duluth IAP vary from approximately 1390 feet above mean sea level (msl) along the northern installation boundary to approximately 1430 feet msl near the developed south-central portion of the base.

Ground water at the base occurs both in the unconsolidated glacial sediments under water table (unconfined) conditions and in the underlying crystalline bedrock within fractures and voids.

The glacial drift aquifer, consisting of a heterogeneous mixture of sand, silt, clay, gravel, and cobbles, etc., is unstratified and locally very compact. This aquifer, which supplies adequate yields for farm and domestic consumption and is the most productive local aquifer, is in hydraulic communication with the underlying bedrock aquifer. Ground water in the glacial drift aquifer is generally encountered at depths of 3 to 25 feet below ground surface. Within the bedrock aquifer, wells drilled to depths of 100 to 700 feet generally encounter water at depths of 10 to 30 feet. Yields from the bedrock aquifer are usually poor (i.e., 5 gallons per minute or less). Water quality from both aquifers is generally good (Engineering-Science, 1982).

Within the Duluth IAP region, ground water, primarily from small capacity glacial drift wells, is utilized by individual domestic or agricultural consumers in isolated areas. City of Duluth water from Lake Superior is supplied to the Duluth IAP and adjacent communities.

Recharge to local aquifers consists of precipitation falling on the unsaturated portion of the aquifer or, in the case of the bedrock aquifer, percolation through a communicating unit in contact with the aquifer.

It has been postulated that Duluth IAP appears to lie within a ground water discharge zone, as evidenced by typically high soil unit water levels, perennial stream flow on and adjacent to the base, and the presence of numerous large, permanent wetlands in the area (Engineering-Science, 1982).

The hydraulic head in the bedrock and the overlying glacial drift near Duluth IAP are similar, whereas the permeability of the bedrock is generally much lower than the permeability in the glacial aquifer. Although the two aquifers are hydraulically connected, the vertical flow from the sediments to the bedrock is believed to be low (Engineering-Science, 1982). Because of these conditions, the principal flow path of ground water in the area has been interpreted to be direct recharge from the ground surface to the shallow water table in the glacial drift, then horizontal flow in the water table to discharge to local streams and ponds (Weston, 1984). The water table, where not perched, is continuous with marsh and bog areas.

Surface drainage at the base flows to two drainage systems. A ground water divide is suspected to exist paralleling the main runway (Engineering-Science, 1982). To the north of the runway, drainage from the northern and western portions of the base drains to Beaver Creek and eventually to Wild Rice Lake, located north of the base. This drainage system includes drainage ditches from the fuel storage area, DPDO Storage Area "C", and the fire training areas. North of the runway in the vicinity of the Goose dump sites, a largely marshy area drains into two unnamed drainageways that flow into Wild Rice Lake. Southeast of the runway, drainage flows south to Miller Creek, which feeds into the St. Louis River (Weston, 1984).

1.3 INDIVIDUAL SITES

1.3.1 Site 1: D-1 Goose Site Dump

Site D-1 is located in a pocket swamp north of the abandoned Goose Site bunkers and to the east of the access road. The period of operation for this site is unknown. The Phase I report notes that approximately 15 empty and rusty 20% DDT drums were observed scattered throughout an approximately 100- by 75-foot area. The barrels appeared empty, and they were not recently discarded.

A potential for migration of pollutants from this site to Wild Rice Lake exists, either by surface water drainage or by ground water flow.

1.3.2 Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)

During the site visit/briefing, it was decided that both fire training areas should be investigated as one site. Both fire training areas, located north of the main runway, are situated in the V shape formed by the two smaller runways.

Site FT-1, in use from 1951 to the early 1960s, is located south of the access road. The activities were conducted in two excavated pits, approximately 40 feet wide, 50 feet long, and 3 to 4 feet in depth, and contained about 2 feet of standing water. For fire training exercises, 300 to 1000 gallons of flammable materials were placed in the pits, ignited, and extinguished with a protein-based foam, aqueous film-forming foam (AFFF), or chlorobromomethane (CB). Carbon tetrachloride may have been used as an extinguishing agent during the early years of pit operation. Materials burned included JP-4 and drummed materials that were not accepted by DPDO for disposal.

Waste materials and residue remained in the pits following the fire training exercises. The fire training exercises were held as frequently as once per week, although once per month was more typical. The pits at Site FT-1 were abandoned, leveled, and filled in the early 1960s (Engineering-Science, 1982).

From the early 1960s to the present, Site FT-2, located north of the access road, has been in use. Fire training activity was originally conducted in an excavated area of the site; the original perimeter berm was removed and the area graded in the early 1970s. Fire training activities are now conducted in a bermed circular area approximately 100 feet in diameter. Runoff from this site is uncontained. Drainage off site to the north eventually reaches Wild Rice Lake.

During the time of the Phase I report, two training exercises per month were carried out. Before the exercise, the ground was saturated with water to minimize infiltration. Up to 500 gallons of JP-4 fuel are burned during a typical training exercise. Formerly, contaminated fuels and drummed POL (waste oils, paint thinners, and solvents) were also burned in the pit. The burn is extinguished with approximately 30 gallons of AFFF. In the past, a protein-based foam and CB were used. After the burn, residual materials remaining in the area infiltrate into the ground or contribute to surface runoff.

Analyses of ground water carried out during the Phase II, Stage 1 investigation indicate that concentrations of total organic carbon (TOC), total organic halogens (TOX), and oil and grease were found in all seven wells installed in the fire training area.

1.3.3 Site 3: S-2 DPDO Storage Area "C"

Waste POL, waste solvents, and chemicals were stored in Area "C" of the DPDO Storage Site S-2 from 1965 to 1980. The site, approximately 90 feet long by 75 feet wide, is unfenced, unlined, and borders a drainage ditch that eventually drains to Wild Rice Lake. This site, no longer used for storage, was the location of minor drum leaks in the past, although no major spills have been recorded. In 1980, several drums of waste oil contaminated soil were removed from this site and spread within Site FT-2.

The proximity of Area "C" to the drainage ditch creates a potential for contaminant migration to exist. No other areas within the present DPDO Storage Area were used for liquid storage.

By means of ten soil borings and two sediment grab samples, the Phase II, Stage 1 investigation found levels of oil and grease and volatile organic aromatics (VOAs) in the unsaturated soil collected to a depth of 2 feet at the storage area.

1.3.4 Site 4: SP-1 Tank Farm Area

The tank farm area, located in the northwest portion of the base and in operation during the 1980s, occupies approximately 5 acres of land bordering the east-west runway. The facility consists of three above-ground storage tanks, fuel loading docks, associated outbuildings, and two small buried tanks: one for fuel oil and one holding tank for waste oil. The tanks are enclosed within earth dikes capable of retaining 110 percent of the tank capacities. Both open and covered drainageways bound the tank farm and loading dock area. These drainageways carry surface runoff from the site to a culvert, which runs from the northwest corner of the site, under the runway, and emerges north of the runway to discharge into Beaver Creek.

During repair of a water line in 1980, oil was observed at a depth of 6 to 7 feet about 100 feet outside the diked area. This excavation revealed diesel fuel No. 2 in the soil and ground water approximately 150 feet from Tank No. 3. Tank No. 3 was taken out of service because a leak was believed to originate with this tank or its feeder lines. The Phase II, Stage 1 report notes that the drainage ditches to the north of the dikes and adjacent to the loading area contain oily seepage. Oily ground water seepage has been observed as discharge from a sump pump operating in a valve box near the loading area. Contaminated soil from the excavation was removed and disposed off site.

1.3.5 Site 5: D-4 South Goose Bunker Dump

The south Goose bunker dump is located south of the abandoned Goose site marker in a swampy area. Several empty drums of unknown materials were deposited along the southern margin of a small body of water. The time of dumping into this area, which is approximately 25 by 35 feet, is unknown. As drainage from this unclosed dump area is northward to Wild Rice Lake, the potential for contaminant migration exists.

Bottom soil samples and one surface water sample from an adjacent pond were found to contain DDD during the Phase II, Stage 1 investigation. A PCB compound, Arochlor-1260, was reported from the same soil and water samples.

1.3.6 Site 6: D-2 Goose Site Dump

According to the Phase I report, approximately ten empty and rusty 55-gallon drums of deicing agent were observed in October 1981 at this site, a wooded ravine area located north of the abandoned Goose missile site and to the west of the access road.

As no other waste materials were observed in this area, it is unlikely that the area contains waste materials covered by fill. There exists a potential for contaminant migration, as drainage from this swampy locality is northward to Wild Rice Lake.

1.3.7 Site 7: D-6 Runway 13 NE Disposal Area

The D-6 disposal site was in use during the 1950s through 1970s. Located northeast of Runway 13, this less than 1-acre site has been closed with local soil cover to an approximate fill depth of 3 to 4 feet. General rubbish, hardfill, aircraft parts, empty drums, and possibly drums containing unburnable and unrecoverable chemicals are believed to have been disposed here. Some debris is still located on the surface. Although no leachate has been detected at this site, there exists a potential for leachate generation due to the shallow water table and, hence, migration of contaminants to local swamps and eventually to Wild Rice Lake.

1.3.8 Site 8: S-1 Old DPDO Storage Area

The base salvage yard area and old DPDO storage area were located north of Washington Street near Building 147. The period of operation for this site was 1950 through 1964. Materials handled through the DPDO storage area included DDT drums, waste fuel oil/solvents, and PCB transformers (Engineering-Science, 1982). Because minor leakage of drums of waste materials was likely to have occurred at this site, a potential for contamination exists.

1.3.9 Site 9: D-9 Disposal Pit

A small pit, approximately 8 by 7 feet, was used during the mid-1960s for the disposal of small amounts of picric acid and acetone from the medics clinic. The identification of percuric acid in the Phase I report (Engineering-Science, 1982) appeared incorrect. Through inquiries made by MANG personnel of the biomedical technician formerly employed at the medics clinic, it was learned that the material disposed of was picric acid (Carlson, 1985). This pit, which also contains small amounts of garbage, was closed with local soil cover.

Although the quantities of wastes disposed at this site are believed to be small, the nature of the materials and the location of the site indicate there is a potential for contaminant migration. Surface drainage in this area is to Miller's Creek.

1.3.10 Site 10: RD-1 Low-Level Radioactive Waste Disposal

At Site RD-1, during the 1950s, low-level radioactive materials such as cathode ray tubes, scopes, and instrument dials were deposited in a 15-foot deep trench approximately 40 feet long. General refuse and garbage covered these low-level radioactive wastes. Local soil cover was used to fill in this area. To insure that no contaminants are migrating from this site, it would be prudent to investigate this disposal area.

A review of the literature and discussions with knowledgeable personnel indicate that the wastes believed to be buried in this disposal area (i.e., cathode ray tubes and oscilloscopes) from this period were large instruments (approximately 2 by 3 feet) housed in metal cabinets containing transformers and, in many cases, small fans. The three radionuclides used for radioluminous dials were tritium, promethium-147, and radium-226.

Radionuclide	Half-Life (years)	Radiations	Average Activity/Dial
Tritium	12.3	Beta	1 mCi
Promethium-147	2.62	Beta	41 μCi
Radium-226	1600	Alpha, Gamma	0.5 μCi

Sources: Moghissi et al., 1978; Public Health Service, 1970.

2.0 SITE INVESTIGATION SUMMARY

2.1 OVERALL FACILITY

The recommended program addresses five original sites evaluated under the Phase II, Stage 1 investigation, and an additional monitoring at six additional sites. The two fire training areas (FT-1 and FT-2) have been consolidated into one site. These sites, listed in Table 1-1, will be investigated under Phase II, Stage 2 by means of 30 new monitor wells, 10 existing monitor wells, 19 borings, 18 surface water samples, and 20 sediment samples. Geophysical surveys are proposed to locate Sites 7, 9, and 10 and to investigate buried pipelines at Site 4 and drums at Site 6. An electromagnetic survey will be conducted to identify leak sites at Site 4. A detailed examination of existing aerial photographs will be performed at Sites 6, 7, 9, and 10.

2.2 INVESTIGATION OF INDIVIDUAL SITES

2.2.1 Site 1: D-1 Goose Site Dump

To assess the potential for migration of pollutants from this site, four monitor wells will be installed, one soil boring will be drilled, and two sediment and two water samples will be taken from the standing water, if present.

The monitor wells -- one assumed upgradient and three assumed downgradient -- will be located in the field as determined by site conditions. The wells will be drilled to a depth no greater than 30 feet, and the screened interval will extend from 5 feet above to 10 feet below the water table. A maximum of four soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

One soil boring will be drilled to a depth of 10 feet or to the water table, whichever is shallower, in the vicinity of the highest concentration of barrels. Soil samples from the ground surface and at the 2½- and 5-foot depths will be analyzed.

Two sampling points will be designated from surface waters located at the site, or from surface waters adjacent to and downstream of the site. Both a water and a sediment sample from each of these surface water sample points will be collected. All water and soil samples will be analyzed for volatile organics and aromatic compounds, oil and grease, pesticides and herbicides, polychlorinated biphenyls (PCBs), phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.2 Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)

To more thoroughly define the potential level of contaminants at the fire training areas and to investigate possible migration of contaminants from the area, five monitor wells will be installed in the vicinity of the fire training areas. One well, in the assumed upgradient direction south of Site FT-1, will be used to provide information for the ambient water quality of the area. This well will be located in the field, and the intent is to position the well on the north side of the ground water divide as noted in the Phase II, Stage 1 report (Weston, 1984). Two wells will be placed downgradient of Site FT-1 on either side of the access road to investigate possible contaminants from Site FT-1. The final two wells will be positioned to the north and downgradient of Site FT-2. The wells will be drilled to a total depth of no greater than 30 feet, with a screened interval extending from 5 feet above to 10 feet below the water table. During the borehole drilling, a maximum of five soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

Two soil borings, one in each fire training area, will be drilled to a total depth of 10 feet. If aerial photographs of Site FT-1 taken during the 1950s can be located to permit identification of the two separate pits, then an additional soil boring will be drilled in Site FT-1; each boring in the fire training burn pits will be centrally located. The soil sampling scheme will follow that outlined for the soil boring at Site 1.

In addition to the monitor wells and soil borings, sediment and surface water samples will be taken to investigate the character of surface runoff from the fire training areas. Dames & Moore concurs with the recommendation made in the Phase II, Stage 1 report regarding sampling the drainageway between the western extension of the access road and the southwestern boundary of Site FT-2. Two sediment and two surface water samples will be obtained from the drainageway, and one sediment and one surface water sample will be obtained from the swamp to the north and downgradient of Site FT-2.

In order to confirm the results of the previous analyses, one ground water sample will be taken from each of the six existing monitor wells. Water level readings will also be read at these wells.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, and phenol. In addition, soil moisture determination will be performed on the soil samples.

Monitor wells that exhibit a layer of floating fuel will be measured for the thickness of the fuel.

2.2.3 Site 3: S-2 DPDO Storage Area "C"

To further define the vertical and horizontal extent of surface and subsurface contamination at this site, three soil borings will be drilled, four monitor wells will be installed, and three sediment samples and three water samples will be collected from the drainageway north of the area.

The monitor wells will be positioned in the field such that one is upgradient and three are downgradient. The exact locations of these wells will be determined by site conditions. The wells will be drilled to a total depth of 30 feet, and the sampling scheme will follow the program for Site 1.

Three soil borings, positioned approximately along a line running north-south in the center of the storage area, will be drilled to a total depth of 10 feet. The soil sampling scheme will follow that outlined for the soil boring at Site 1.

To trace the possible migration of contaminants along the drainageway north of the storage area, three sediment and three surface water samples will be collected in the drainageway. The first sediment and water sample will be taken in the approximate position of Sample 2 (Phase II, Stage 1 study) to confirm the results already obtained. The next two sets of samples will be taken at 100-foot intervals along the drainageway. It is believed that sampling locations thus positioned will investigate off-site migration by surface flow.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.4 Site 4: SP-1 Tank Farm Area

Before field investigations commence, a geophysical survey will be conducted using a metal locator and/or magnetometer to locate underground pipes. A grid system will be constructed and tied into local ground coordinates so that pipeline locations can be verified for information provided by MANG personnel. An electromagnetic mapping (EM) survey will also be performed to identify leak sites from these pipes. The entire tank farm will be surveyed to include a minimum 50-foot buffer around the site perimeter. In addition, the survey will be expanded on the southern side of the tank farm area to the main access road.

The Phase II, Stage 1 study, by means of four monitor wells, two test pits, and 20 well points, revealed that free-floating fuel oil was observed in the soil borings, test pits, and drainage water in the immediate vicinity of the fuel storage area. Water levels obtained from the well points and monitor wells permitted construction of a water table map for the storage area. The gradient is towards the northwest in the western portion of the storage area and towards the northeast in the eastern portion of the site.

An additional four monitor wells will be installed, five soil borings will be drilled, and four sediment and four surface water samples will be taken to more clearly define contaminant migration from this site. One monitor well will be placed south of the present Well MW-8, in the assumed upgradient direction. Three wells will be placed downgradient of the storage tanks to intercept a plume if it exists. If feasible, one well will be placed within the area south of the "Y" formed by the drainage culverts as they exit the site to the north. The wells will be installed and sampled as outlined for Site 1.

Five soil borings will be drilled to a total depth of 15 feet each or to the water table. Samples will be taken at 2½-foot intervals beginning at ground surface. Samples at 2½, 5, and 7½ feet will be analyzed.

As noted in the Phase II, Stage 1 study, it appears that the ground water surface around the entire site is intercepted by surface drainageways or buried culverts, which act as discharge lines for the upper several feet of the ground water table. Therefore, additional sediment and water samples are warranted from the drainageway/culverts as they exit the fuel storage area. Four sediment and four surface water samples will be taken, beginning at the joint between the drainageways and continuing at 100-foot intervals along the northern route of this system.

The four existing monitor wells will be used for determination of water levels, and samples will be taken for analysis. If floating fuel is encountered in the wells, the fuel product thickness will be measured.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, and oil and grease. In addition, soil moisture determination will be performed on the soil samples.

2.2.5 Site 5: D-4 South Goose Bunker Dump

Three monitor wells, three surface water, and five sediment samples will be used to investigate this site. One monitor well will be positioned outside the site perimeter and consistent with the assumed upgradient direction of ground water flow. Two wells, situated approximately 50 feet from the site perimeter, will be located in the assumed downgradient direction. Because of local topographic features, the exact gradient at this site is uncertain. The intent of the triangular positioning of the wells is to assess both upgradient and downgradient water quality. Wells will be constructed to a total depth no greater than 30 feet, and installation procedures will follow those outlined for Site 1. During the borehole drilling, a maximum of three soil samples will be collected and analyzed. The actual sample locations (borehole and depth) will be at the field supervisor's discretion. From each well, one water sample will be collected and analyzed.

Three surface water samples from the pond/swamp will be collected, as well as a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways that exit this site. These samples will serve to confirm the analyses performed during the Phase II, Stage 1 investigation and to help clarify the pesticide and PCB analyses results.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.6 Site 6: D-2 Goose Site Dump

Before field investigations commence, a geophysical survey will be conducted using a metal detector and a magnetometer to locate the dump site drums. To further aid in locating the drums and defining the site location, a detailed examination of available aerial photographs will be performed.

If this site can be located during the planning/mobilization phase of the study, then two soil borings will be drilled to investigate the site. One boring will be located in the immediate vicinity of the drums, and the other boring will be placed at a distance of 25 feet in the assumed downgradient direction. Soil samples will be collected at 2½-foot intervals to a total depth of 10 feet or to the water table. Samples at the ground surface and 2½ feet will be analyzed.

The samples will be analyzed for volatile organics, aromatic compounds, oil and grease, ethylene glycol, and soil moisture determination.

2.2.7 Site 7: D-6 Runway 13 NE Disposal Area

Before field investigations commence, a geophysical survey will be conducted using a metal detector and a magnetometer to define the site boundaries. In addition, a detailed examination of available aerial photographs will be performed.

Three monitor wells will be installed to investigate possible migration of contaminants from this site. Well construction will follow the procedure outlined for Site 1. The wells will be positioned in the field, one in the assumed upgradient and two in the downgradient direction. Sampling procedures will be the same as those for Site 5.

Two soil borings will be drilled to a total depth of 10 feet. Samples will be taken from the ground surface at 2½-foot intervals, extending to 10 feet. Soil samples from the ground surface and the 2½-foot depth will be analyzed.

If surface drainage from the site can be located, one sediment sample and one surface water sample will be collected outside but within 20 feet of the site boundary.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.8 Site 8: S-1 Old DPDO Storage Area

Three monitor wells, two soil borings, two surface water samples, and two sediment samples will be used to investigate this site. The three wells will be constructed to a total depth of 30 feet, and installation procedures will follow those outlined for Site 1. Sampling procedures will be the same as those for Site 5. Because of uncertainty about the local gradient at this site, exact positioning of wells will be located in the field, with the intention being to locate one upgradient and two downgradient. The soil borings drilled to a depth of 10 feet will be placed in the centers of the two areas, one in the northeast and one in the southwest quadrant. Soil samples will be analyzed from samples taken at ground surface, 2½, and 5 feet. The surface water and sediment samples will be collected from drainageways at points downstream of the site.

All water and soil samples will be analyzed for volatile organics, aromatic compounds, oil and grease, pesticides and herbicides, PCBs, phenols, and metals. In addition, soil moisture determination will be performed on the soil samples.

2.2.9 Site 9: D-9 Disposal Pit

A geophysical survey will be conducted during the planning/mobilization stage of the study to attempt to locate this site by the response of a metal locator and/or magnetometer to the assumed metallic refuse interred in this pit. A grid system will be constructed and tied into local ground coordinates so that the boundaries of the burial pit can be defined. To further aid in defining the site boundaries, a detailed examination of available aerial photographs will be performed.

If this site can be identified, one monitor well will be installed near the assumed downgradient boundary of the pit. The well will be constructed and installed according to those procedures outlined for Site 1. One water sample will be collected and analyzed.

In addition, one boring will be drilled in the immediate vicinity of contamination. Soil samples will be collected at 2½-foot intervals to a total depth of 10 feet or to the water table. Samples at 2½ feet above and 2½ feet below the water table will be analyzed. Water and soil samples will be analyzed for acetone and picric acid.

2.2.10 Site 10: RD-1 Low-Level Radioactive Waste Disposal

A geophysical survey (metal detector and magnetometer) and a review of available aerial photographs will be performed to accurately locate this disposal area.

If the disposal area can be located, then three monitor wells will be installed, one upgradient and two downgradient. From each well, one water sample will be collected and analyzed. The waste, reported to be buried at a depth of 15 feet and higher elevations, is assumed to be below the water table. The purpose of the well installations is to obtain ground water samples downgradient of the burial trench and analyze for gross alpha, gross beta, and radium-226 and radium-228. The results of analyses of these samples will be compared with the ambient ground water quality and the USEPA drinking water standards for radiation.

3.0 FIELD SETUP

3.1 DETAILED WORK PLAN

3.1.1 Planning

- o Contact MANG and TAC regarding meeting time and place.
- o MANG and TAC contact station POC to establish meeting specifics.
- o Contact surveyor subcontractor regarding survey start date.
- o Contact drilling subcontractor regarding start date.
- o Notify chemistry laboratory subcontractor to prepare bottles (cleaning, preservatives, etc.) and shipping containers.
- o Make travel arrangements.
- o Write purchase orders for drilling subcontractor, surveyor subcontractor, chemistry subcontractor.
- o Assemble and assess condition of all field equipment and supplies.
- o Replace, repair, and supplement field equipment and supplies.
- o Prepare Technical Operations Plan and submit to MANG and TAC.
- o Brief field personnel on Statement of Work (SOW); provide with TOP.
- o Order health and safety equipment.

3.1.2 Mobilization

- o Senior geologist and field engineers mobilize from Chicago; geophysicist mobilizes from Santa Barbara.
- o Survey crew mobilizes from Duluth.
- o Drilling subcontractor mobilizes from Minneapolis.
- o Field equipment is sent from California and Chicago.
- o Field supplies are sent from California and Chicago. Remaining supplies are purchased in Minnesota.
- o Rent vehicles, locate housing.
- o Field equipment, supplies, chemistry bottles, and shipping containers are stored in base temporary office area (SOW, p. 16, III).
- o Decontamination area is tested (i.e., water pressure, electrical hookups, etc.) (SOW, p. 16, III.F).

- Dames & Moore personnel review existing engineering plans, drawings, diagrams, aerial photographs, etc. to evaluate sites to be investigated.

3.1.3 On-Site Setup

- Senior engineer meets with MANG and TAC officials, base POC, and USAFOEHL Technical Monitor. Statement of Work reviewed; boring locations for wells/borings are discussed, and tentative locations are staked and numbered. Underground utilities are located and access problems resolved.
- MANG personnel brief Dames & Moore personnel, drilling and surveying crews on rules and regulations involved with working on base. Briefings may involve several meetings, as mobilization of personnel is staggered (geophysics first, drilling and sampling second, survey third).
- MANG issues personnel identification badges and vehicle passes and/or entry permits.
- Geophysicist is briefed on site-specific conditions for Sites 4, 6, 7, 9, and 10 by consulting with MANG personnel and surveyor. Geophysicist and assistant establish grids for geophysical survey. USAF clearance on work granted.
- Orientation of drilling crew to site conditions, discussion of well/boring locations.
- Finalizing well/boring locations with base POC. MANG gives clearance and sign-off on digging permits.
- Senior geologist orients field engineer to site conditions and proposed boring locations.
- Discussion with base POC regarding handling procedures and 10 percent selection process of samples to be sent to OEHL, San Antonio.
- Commence drilling operations.

3.2 DAMES & MOORE HEALTH AND SAFETY PLAN

Project Name and Number: Phase II, Stage 2 Installation Restoration Program
01016-267-07

Project Site Location: Duluth International Airport, Duluth, Minnesota

Project Leader: Carol J. Scholl

Site Project Manager and On-Site Safety Officer: Amy D. Lamborg

Plan Preparer: Michael W. Ander

Plan Reviewer: David Dahlstrom

Preparation Date: June 28, 1985

Plan Approvals:

Office Safety Coordinator

____

Michael W. Ander (date)

Managing Principal-in-Charge

____

Glenn D. Martin (date)

Project Manager

____

Carol J. Scholl (date)

I. PURPOSE

The purpose of this Plan is to assign responsibilities, establish personnel protection standards, specify mandatory operating procedures, and provide for contingencies that may arise while operations are being conducted at the site.

II. APPLICABILITY

The provisions of the Plan are mandatory for all on-site Dames & Moore employees and subcontractors engaged in hazardous material management activities including but not limited to initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization.

III. RESPONSIBILITIES

A. Site Project Manager (SPM)

The SPM shall direct on-site investigation and operational efforts. At the site, the SPM, assisted by the On-Site Safety Officer, has the primary responsibility for:

1. Assuring that appropriate personnel protective equipment is available and properly utilized by all on-site personnel.
2. Assuring that personnel are aware of the provisions of this plan, and are instructed in the work practices necessary to ensure safety and planned procedures for dealing with emergencies.
3. Assuring that personnel are aware of the potential hazards associated with site operations (see Tables 3-1 and 3-2).
4. Monitoring the safety performance of all personnel to ensure that the required work practices are employed.
5. Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.
6. Preparing any accident/incident reports (see attached Accident Report Form).
7. Assuring the completion of Plan Acceptance and Feedback forms attached herein.

TABLE 3-1

EXPOSURE LIMITS AND RECOGNITION QUALITIES

Compound	Exposure Standard[a]	Recognition Qualities: Color	Odor	State
Gasoline	300 ppm	None to pale brown or pink	Gasoline (0.25 ppm)[b]	Liquid
Benzene	1 ppm	None	Aromatic	Liquid
Xylene	100 ppm	None	Aromatic	Liquid
Toluene	200 ppm	None	Aromatic	Liquid
Picric Acid[c]	0.1 mg/m^3	None to yellow	Odorless	Solid or liquid
Acetone	1000 ppm	None	Ether-like	Liquid
DDT	1 mg/m^3	None	Weak chemical odor	Solid
Chlorobromomethane	200 ppm	None to pale yellow	Sweet	Liquid
Carbon Tetrachloride	10 ppm	None	Ether-like	Liquid
PCBs	1 mg/m^3	None	Odorless	Liquid
Radium	1×10^{-12} μCi/ml	White	Odorless	Solid
Ethylene Glycol	50 ppm	None	Odorless	Liquid
Chloroform	50 ppm	None	Sweet	Liquid
Trichloroethylene	100 ppm	None	Sweet	Liquid
1,1,1-Trichloroethane (Methyl Chloroform)	350 ppm	None	Sweet	Liquid
Tetrachloroethylene	100 ppm	None	Sweet	Liquid
1,2-Dichloroethane (Ethylene Dichloride)	50 ppm	None	Sweet	Liquid
1,1-Dichloroethane	100 ppm	None	Sweet	Liquid

[a]OSHA permissible exposure limit or ACGIH Threshold Limit Value.

[b]Odor detection threshold.

[c]DOT designated Class A explosive: possible detonation upon rapid heating or mechanical shock; not a problem if dissolved in water.

TABLE 3-2

SYMPTOMS OF OVEREXPOSURE, POTENTIAL CHRONIC EFFECTS, AND FIRST-AID TREATMENT

COMPOUND	SYMPTOMS OF OVEREXPOSURE			POTENTIAL CHRONIC EFFECTS
	EYE	SKIN	INHALATION/INGESTION	
Gasoline	Irritation	Irritation, drying	Irritation of mucous membranes, dizziness, uncoordination, coughing, gagging.	--
Benzene	Irritation	Dermatitis	Giddiness, headache, nausea, fatigue, staggering gait.	Aplastic anemia, leukemia.
Xylene	Irritation	Dermatitis	Dizziness, uncoordination, nausea.	Central nervous system, liver, and kidney damage.
Toluene	--	Dermatitis	Fatigue, confusion, dizziness, headache.	Central nervous system, liver, and kidney damage.
Picric Acid	Irritation	Dermatitis	Yellow-stained teeth, weakness, bitter taste, gastrointestinal distress, nephritis.	Kidney, liver, blood, skin, and eye damage.
Acetone	Irritation	Dermatitis	Irritation of nose and throat, dizziness.	Respiratory system and skin damage.
DDT	Irritation	Irritation	Paresthesias of tongue, lips, and face, tremors, apprehension, dizziness, confusion, headache, malaise, vomiting, partial paralysis of hands.	Central nervous system, kidney, liver, skin, and peripheral nervous system damage.

TABLE 3-2 (continued)

COMPOUND	SYMPTOMS OF OVEREXPOSURE			POTENTIAL CHRONIC EFFECTS
	EYE	SKIN	INHALATION/INGESTION	
Chlorobromomethane	Irritation	Irritation	Disorientation, dizziness, irritation of throat, pulmonary edema.	Skin, liver, kidney, respiratory system, lung, and central nervous system damage.
Carbon Tetrachloride	--	Irritation	Central nervous system depressant, nausea, vomiting.	Central nervous system, eye, lung, liver, kidney, and skin damage.
PCBs	--	Chloracne	Nausea, vomiting, loss of weight, jaundice, edema, abdominal pain.	Liver and skin damage.
Radium	--	--	--	Lung cancer, bone cancer, osteitis, skin damage, blood dyscrasias.
Ethylene Glycol	Irritation	Irritation	Initial central nervous system stimulation followed by depression.	Kidney damage.
Chloroform	Irritation	Irritation	Dizziness, mental dullness, headache, nausea, anesthesia, fatigue.	Liver, kidney, heart, eye, and skin damage.
Trichloroethylene	Irritation	Dermatitis	Headache, vertigo, tremors, somnolence, nausea, vomiting, cardiac arrhythmias, paresthesias.	Respiratory system, heart, liver, kidneys, central nervous system, and skin damage.
Tetrachloroethylene	Irritation	--	Irritation of nose and throat, nausea, flushed face and neck, vertigo, uncoordination, erythemia.	Liver, kidney, eye, upper respiratory system, and central nervous system damage.

TABLE 3-2 (continued)

COMPOUND	SYMPTOMS OF OVEREXPOSURE EYE	SKIN	INHALATION/INGESTION	POTENTIAL CHRONIC EFFECTS
1,1-Dichloroethane	--	Irritation	Central nervous system depression, drowsiness, unconsciousness.	Skin, liver, and kidney damage.
1,1,1-Trichloroethane (Methyl Chloroform)	Irritation	Dermatitis	Headache, lassitude, central nervous system depression, poor equilibrium, cardiac arrhythmias.	Skin, central nervous system, eye, and cardiovascular system damage.
1,2-Dichloroethane (Ethylene Dichloride)	Irritation	Dermatitis	Central nervous system depression, nausea, vomiting, corneal opacity.	Kidney, liver, eye, skin, and central nervous system damage.

GENERAL FIRST-AID TREATMENT

Eye -- Irrigate immediately.
Skin -- Soap wash promptly.
Inhalation -- Move to fresh air.
Ingestion -- Get medical attention.

ACCIDENT REPORT FORM

SUPERVISOR'S REPORT OF ACCIDENT			DO NOT USE FOR MOTOR VEHICLE OR AIRCRAFT ACCIDENTS
TO	FROM TELEPHONE (include area code)		
NAME OF INJURED OR ILL EMPLOYEE			
DATE OF ACCIDENT	TIME OF ACCIDENT	EXACT LOCATION OF ACCIDENT	
NARRATIVE DESCRIPTION OF ACCIDENT			
NATURE OF ILLNESS OR INJURY AND PART OF BODY INVOLVED			LOST TIME YES ☐ NO ☐
PROBABLE DISABILITY (check one) FATAL ☐ LOST WORK DAY WITH __ DAYS AWAY FROM WORK ☐ LOST WORK DAY WITH __ DAYS OF RESTRICTED ACTIVITY ☐ NO LOST WORK DAY ☐ FIRST AID ONLY ☐			
CORRECTIVE ACTION TAKEN BY REPORTING UNIT			
CORRECTIVE ACTION THAT REMAINS TO BE TAKEN (by whom and by when)			
NAME OF SUPERVISOR		TITLE	
SIGNATURE		DATE	

FORM #IHST-1

REVIEW RECEIPT

PROJECT HEALTH AND SAFETY PLAN

Instructions: This form is to be completed by each person to work on the site and returned to the Program Director-Industrial Hygiene and Safety.

Job No. 01016-267-07

Project: Phase II, Stage 2 Environmental Investigation
Duluth International Airport, Minnesota

Rev. No. 0 Date 06/28/85

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it.

____
Signed

____
Date

PLAN FEEDBACK FORM

Problems with plan requirements:

Unexpected situations encountered:

Recommendations for future revisions:

PLEASE RETURN TO THE FIRMWIDE HEALTH AND SAFETY OFFICE - NY

B. Project Personnel

Project personnel involved in on-site investigations and operations are responsible for:

1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.

2. Implementing Project Health and Safety Plans, and reporting to the SPM for action any deviations from the anticipated conditions described in the Plan.

3. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the SPM.

IV. BACKGROUND

A. Site History

Based on preliminary site evaluation of Duluth International Airport (IAP), Minnesota, there appear to be ten (10) areas that may have generated significant environmental contamination over the lifetime of the facility. Suspected contaminants have been identified, and at some sites a preliminary estimate of concentrations has been made. Dames & Moore anticipates that site conditions are such that only relatively low levels of contaminants may be encountered during the proposed drilling and soil and water sampling.

Site 1: D-1 Goose Site Dump -- Potential contaminants at this site include DDT (and its breakdown product, DDD) and PCBs. The Phase I report noted that approximately 15 empty 20% DDT drums were observed at the site. Soil and water analyses conducted during the Phase II, Stage 1 investigation found low levels of DDD and the PCB compound Arochlor-1260.

Site 2: FT-1 and FT-2 Fire Training Areas -- During fire training exercises at these sites, 300 to 1000 gallons of flammable materials were placed in pits, ignited, and extinguished with a protein-based foam, AFFF, or chlorobromomethane. Carbon tetrachloride may also have been used during the early years of pit operation. Materials burned included JP-4, waste oils, paint thinners, and solvents. Area FT-1 was in use from 1951 to the early 1960s. Activities then were switched to Area FT-2 and continue to the present time.

Site 3: S-2 DPDO Storage Area "C" -- Waste POL, waste solvents, and chemicals were stored in Area "C" of the DPDO Storage Site S-2 from 1965 to 1980. Although minor drum leaks have occurred, no major spills have been recorded. The Phase II, Stage 1 investigation at this site found the following chemicals in soil at the site at or below the given concentrations: oil and grease (50 mg/g), chloroform (0.315 μg/g), trichloroethylene (0.940 μg/g), trichloroethane (0.210 μg/g), bromochloromethane (0.016 μg/g), dibromochloromethane (0.003 μg/g), dichloroethylene (0.037 μg/g), and dichloroethane (0.018 μg/g).

Site 4: SP-1 Tank Farm Area -- The tank farm facility consists of three above-ground fuel storage tanks, fuel loading docks, associated outbuildings, and two small buried tanks, one for fuel oil and one holding tank for waste oil. During repair of a water line in 1980, diesel fuel No. 2 was observed at a depth of 6 to 7 feet. The fuel is believed to have originated from a leak in Tank No. 3 or its feeder line.

Site 5: D-4 South Goose Bunker Dump -- Two empty drums of unknown origin were found at this site along with some miscellaneous trash. The Phase I report stated that water samples from this site were analyzed but no contaminants were detected.

Site 6: D-2 Goose Site Dump -- Approximately 10 empty and rusty 55-gallon drums of deicing agent (ethylene glycol) were observed at this site in October 1981. No other waste materials are known to be present.

Site 7: D-6 Runway 13 NE Disposal Area -- General rubbish, hardfill, aircraft parts, empty drums, and possibly drums containing unburnable and unrecoverable chemicals are believed to have been disposed of at this less-than-1-acre site. No leachate has been observed, although there is a potential for leachate generation due to the shallow water table.

Site 8: S-1 Old DPDO Storage Area -- Materials handled through the DPDO Storage Area during the period from 1950 through 1964 included DDT drums, waste fuel oil/solvents, and PCB transformers (Engineering-Science, 1982). There is a potential for leakage of drums to have caused contamination at this site.

Site 9: D-9 Disposal Pit -- A small pit at this site, approximately 7 by 8 feet, was used during the mid-1960s for the disposal of small amounts of picric acid and acetone from the medics clinic. Small amounts of garbage were also disposed of here. The exact location of the pit is unknown.

Site 10: RD-1 Low-Level Radioactive Waste Disposal -- During the 1950s, low-level radioactive materials such as cathode ray tubes, scopes, and instrument dials were deposited in a 15-foot deep trench approximately 40 feet long. General refuse and garbage covered the radioactive wastes, and local soil was used to cap the pit. The three radionuclides most commonly used for instrument dials were radium-226, promethium-147, and tritium.

B. Dames & Moore Activity

Dames & Moore will be conducting the following activities at Duluth IAP:

1. Site 1: D-1 Goose Site Dump

a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of ground water flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of ground water flow. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of four soil samples for laboratory analysis.

b. Drill one soil boring in the suspected zone of contamination and collect soil samples from the ground surface and at each 2½-foot interval until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at the 2½- and 5-foot depths.

c. Designate two sampling points from surface waters located at the site, or from surface waters adjacent to and downstream of the site.

d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.

e. Analyze all soil and water samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), oil and grease (USEPA 413.2), pesticides (E 608 and SW 3550 and 8080), herbicides (E 615 and SW 8150), polychlorinated biphenyls (PCBs) (E 608 and SW 3550 and 8080), phenols (E 420.2 and E 420.2 modified), arsenic (E 206.2 and SW 3050 and 7060), barium (E 208.2 and SW 3050 and 6010), cadmium (E 213.2 and SW 3050 and 6010), chromium (E 218.1 and SW 3050 and 6010), lead (E 239.2 and SW 3050 and 6010), mercury (E 245.1 and SW 7471), selenium (E 270.3 and SW 3050 and 7740), and silver (E 272.2 and SW 3050 and 6010).

2. <u>Site 2: FT-1 Fire Training Area (1951 to Early 1960s) and FT-2 Fire Training Area (Early 1960s to Present)</u>

a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of ground water flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of ground water flow: two between FT-1 and FT-2 on either side of the access road, and two north of FT-2. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis.

b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each 2½-foot interval until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the ground surface and the 2½- and 5-foot depths.

c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundary of FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.

d. Collect one surface sediment sample and one surface water sample from the swamp to the north and downgradient of FT-2.

e. Collect one ground water sample from each of the six existing monitor wells at this site.

f. Analyze all water and soil samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), oil and grease (USEPA 413.2), and phenols (E 420.2 and E 420.2 modified).

3. <u>Site 3: S-2 DPDO Storage Area "C"</u>

a. Drill and construct a maximum of four monitor wells. The positioning and soil and water sampling follow that specified for Site 1.

b. Drill three soil borings positioned along a centerline running north to south in the storage area. Follow the soil sampling plan specified for Site 1.

c. Designate sampling points in the drainageway that begins on the east side of the storage area and then heads in a northeasterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water samples in the approximate location of Sample 2 identified in the Stage 1 study. Subsequent sample points should be at 100-foot intervals downgradient along the drainageway.

d. Analyze all water and soil samples as specified for Site 1.

4. <u>Site 4: SP-1 Tank Farm Area</u>

a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50-foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main access road. A former fueling facility is located south of the tank farm.

b. Drill and construct a maximum of four monitor wells. The well positioning and soil and water sampling follow that specified for Site 1.

c. Drill five soil borings, positioning them based on the geophysical survey results and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at 2½-foot intervals beginning at ground surface. Analyze the samples collected at 2½-, 5-, and 7½-foot depths.

d. Designate sample points in the drainageways/culverts around the site. Of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.

e. Collect one round of ground water samples from the four existing monitor wells at this site.

f. Analyze all water and soil samples for volatile organics (USEPA 601 and SW 8010), aromatic compounds (E 602 and SW 8020), and oil and grease.

5. Site 5: D-4 South Goose Bunker Dump

a. Drill and construct three monitor wells. Position two of the wells approximately 50 feet from the site perimeter and consistent with the assumed downgradient direction of ground water flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of ground water flow. Collect one ground water sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis.

b. Collect three surface water samples from the pond/swamp at this site.

c. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways that exit this site.

d. Analyze all water and soil samples as specified for Site 1.

6. Site 6: D-2 Goose Site Dump

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more work.

c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at 2½-foot intervals until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at 2½ feet.

d. Analyze all soil samples for ethylene glycol (NIOSH P and CAM 338), oil and grease (USEPA 413.2), volatile organics (USEPA 601 and SW 8010), and aromatic compounds (E 602 and SW 8020).

7. Site 7: D-6 Runway 13 NE Disposal Area

a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. Drill and construct three monitor wells. The positioning and soil and water sampling follow that specified for Site 5.

c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at 2½-foot intervals until the estimated final borehole depth of 10 feet is reached. Analyze the samples from the surface and at the 2½-foot depth.

d. If surface drainage from the site can be located, collect one bottom sediment and one surface water sample outside but within 20 feet of the site boundary.

e. Analyze all water and soil samples as specified for Site 1.

8. Site 8: S-1 Old DPDO Storage Area

a. Drill and construct three monitor wells. The positioning and soil and water sampling follow that specified for Site 5.

b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified for Site 1.

c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.

d. Analyze all water and soil samples as specified for Site 1.

9. <u>Site 9: D-9 Disposal Pit</u>

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.

c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at 2½-foot intervals and analyze the samples at 2½ feet above and below the water table.

d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed downgradient direction of ground water flow. Collect one ground water sample.

e. Analyze all water and soil samples for acetone (ASTM D 3695-82) and picric acid (USATHAMA 2B and 2C).

10. <u>Site 10: RD-1 Low-Level Radioactive Waste Disposal</u>

a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.

b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of ground water flow. Place the third well in the assumed upgradient direction of ground water flow to collect ambient water quality information. Do not analyze

soil samples from these boreholes. Collect one water sample from each well.

c. Analyze all water samples for gross alpha (Standard Methods, 16th ed., 703), gross beta (Standard Methods, 16th ed., 703), radium-226 (EPA-600/4-80-032, 903.0) and radium-228 (EPA-600/4-80-032, 904.0).

C. Suspected Hazards

There is a potential for exposure to the chemicals listed in Tables 3-1 and 3-2. Because past analyses have indicated that the chemicals, if present, are at very low concentrations, and because Dames & Moore will not be drilling directly in the areas of waste disposal but only upgradient and downgradient, it is expected that the potential exposures will be at very low concentrations. Picric acid is a DOT designated Class A explosive that is subject to possible detonation upon rapid heating or mechanical shock; this is not a problem if it is dissolved in water.

V. EMERGENCY CONTACTS AND PROCEDURES

Should any situation or unplanned occurrence require outside or support services, the appropriate contact from the following list should be made:

Agency	Person to Contact		Telephone
D&M Project Leader	Amy Lamborg	(office) (home)	312-297-6120 312-328-0671
D&M Industrial Hygiene and Safety Director	David Dahlstrom	(office) (home)	404-262-2915
Police	MANG		218-723-7280
Fire	MANG		218-723-7233
Emergency	Commercial Ambulance		218-722-0807
Safety			
TAC Clinic	Sgt. Suzanne Grage		218-723-7224
Civil Engineering	Capt. Gary Niemi	(office)	218-723-7339

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- o Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on scene.

- o A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

a. In the event that any member of the field crew experiences any adverse effects or symptoms of exposure while on scene, the entire field crew should immediately halt work and act according to the instructions provided by the SPM.

b. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team and reevaluation of the hazard and the level of protection required.

c. In the event that an accident occurs, the SPM is to complete an Accident Report Form for submittal to the MPIC of the office, with a copy to the Health and Safety Program Office. The MPIC should assure that followup action is taken to correct the situation that caused the accident.

VI. HAZARD CHARACTERISTICS, MONITORING METHODS, AND PROTECTION REQUIRED

Exposure Limits and Recognition Qualities

Information concerning exposure limits and recognition qualities of the contaminants that are suspected to be on site is presented in Table 3-1.

Symptoms of Overexposure, Potential Chronic Effects and First Aid Treatment

Symptoms of overexposure to the suspected contaminants, potential chronic effects of these substances, and first aid treatment information are presented in Table 3-2.

Monitoring Methods, Action Levels and Protective Measures

Methods for monitoring for suspected contaminants, action levels, and protective measures to be used for various contaminant concentration levels are presented in Table 3-3.

TABLE 3-3

HAZARD MONITORING METHOD, ACTION LEVELS, AND PROTECTIVE MEASURES

Hazard	Monitoring Method	Action Level	Protective Measures
Explosive Atmosphere	Explosimeter or Combustible Gas Meter	< 10% LEL	Continue working
		10 - 25% LEL	Continue working with continuous monitoring
		> 25% LEL	EVACUATE the area; EXPLOSION HAZARD
Organic Vapors	Photoionization Detector (HNU)	< 50 ppm	Continue working
		50 - 1000 ppm	Continue working with half-face respirator with organic vapor cartridges
		> 1000 ppm	EVACUATE the area

Protective Equipment Required for On-Site Activities

The protective equipment required may vary, depending on the concentrations and dispersion of contaminants encountered during each phase of the work. Table 3-4 specifies protective equipment required for each on-site activity.

TABLE 3-4

PROTECTIVE EQUIPMENT REQUIRED FOR ON-SITE ACTIVITIES

Activity/Location	Protective Equipment
During drilling and sampling	Half-face respirator with organic vapor cartridges*
	Nitrile gloves
	Rubber boots (steel toed)
	Hard hat with splash shield
	Disposable Tyvek coveralls

*If photoionization detector reading is greater than 50 ppm.

ATTACHMENT 1

PROTECTIVE EQUIPMENT

I. INTRODUCTION

When field investigation activities are conducted where atmospheric contamination is known or suspected to exist, where there is a potential for the generation of vapors or gases, or where direct contact with toxic substances may occur, equipment to protect personnel must be worn. Respirators are used to protect against inhalation and ingestion of atmospheric contaminants. Protective clothing is worn to protect against contact with and possible absorption of chemicals through the skin. In addition to protective clothing and respiratory protection, safe work practices must be followed. Good personal hygiene practice prevents ingestion of toxic materials.

Personnel equipment to be used has been divided into two categories commensurate with the degree of protection required, namely Levels C and D protection.

II. LEVELS OF PROTECTION

A. Level C

1. Personal Protective Equipment

- o Air-purifying respirator (MSHA/NIOSH approved)
- o Disposable chemical resistant coveralls
- o Gloves, outer, working gloves
- o Gloves, inner, chemical resistant
- o Boots, steel toe and shank
- o Hard hat (face shield)
- o Rubber boots, outer, chemical resistant (disposable)

2. Criteria for Selection

a. Air concentrations of identified substances are such that reduction to at or below the substance's exposure limit is necessary and the concentration is within the service limit of the cartridge.

b. Atmospheric contaminant concentrations do not exceed the Immediately Dangerous to Life or Health (IDLH) levels.

c. Contaminant exposure to unprotected areas (head and neck) are within skin exposure guidelines, or dermal hazards do not exist.

d. Job functions have been determined not to require a higher level of protection.

B. Level D

1. Personal Protective Equipment

- o Coveralls
- o Boots/shoes, safety or chemical resistant, steel toe and shank
- o Boots, outer (chemical resistant disposables)
- o Hard hat (face shield)
- o Gloves

2. Criteria for Selection

a. No indication of any atmospheric hazards.

b. Work function precludes dusting, splashes, immersion, or potential for exposure to any chemicals.

3. Guidance on Selection Criteria

a. Level D protection is primarily a work uniform and should not be worn in any area where the potential for contamination exists.

b. In situations where respiratory protection is not necessary, but site activities are needed, chemical resistant garments — high quality or disposable — must be worn.

III. RESPIRATORY PROTECTION

The following procedures should be used for respiratory protection:

A. Inspect all washers, diaphragms, and facepiece-to-face seal area for any tears, pinholes, deformation, or brittleness. Should any of these exist, use a different respirator.

B. Place the respirator on the face, tighten and use both a positive and a negative pressure test, prior to entering the site, to assure a proper fit. Checking for proper fit involves the following:

1. **Negative Pressure Test**

   Close off the inlet opening of the cartridge or the breathing tube by covering it with the palm of the hand or by replacing the tap seal. Gently inhale so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.

2. **Positive Pressure Test**

   Remove the exhalation valve cover. Close off the exhalation valve with the palm of the hand. Exhale gently so that a slight positive pressure is built up in the facepiece. If no outward leakage of air is detected at the periphery of the facepiece, the face fit is satisfactory. (Note: With certain devices, removal of the exhaust valve cover is very difficult, making the test almost impossible to perform.)

ATTACHMENT 2

DAMES & MOORE STANDARD OPERATING PROCEDURES

WORK PRACTICES

1. Smoking, eating, drinking, and chewing tobacco are prohibited in the contaminated or potentially contaminated area.

2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surface (i.e., ground, etc.).

3. All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations (i.e., presence of strong and irritating or nauseating odors).

4. Prevent, to the extent possible, spillages. In the event that a spillage occurs, contain liquid if possible.

5. Prevent splashing of the contaminated materials.

6. Field crew members shall be familiar with the physical characteristics of investigations, including:

   - wind direction
   - accessibility to associates, equipment, vehicles
   - communication
   - hot zone (areas of known or suspected contamination)
   - site access
   - nearest water sources

7. The number of personnel and equipment in the contaminated area should be minimized consistent with site operations.

8. All wastes generated during D&M and/or subcontractor activities on site should be disposed of as directed by the Field Activity Leader.

HALF-FACE RESPIRATORS

Inspection Procedure

1. Look for breaks or tears in the headband material. Also stretch to check the elasticity.

2. Make sure all headbands, fasteners, and adjusters are in place and not bent.

3. Check the facepiece for dirt, cracks, tears, or holes. The rubber should be flexible, not stiff.

4. Look at the shape of the facepiece for possible distortion that may occur if the respirator is not protected during storage.

5. Check the exhalation valve located near the chin between the cartridges by the following:

   - Unsnap the cover;

   - Lift the valve and inspect the seat and valve for cracks, tears, dirt, and distortion; and

   - Replace the cover. It should spin freely.

6. Check both inhalation valves (inside the cartridge holders). Look for same signs as above.

7. Check the yoke for cracks.

8. Make sure the cartridge holders are clean. Make sure the gaskets are in place and the threads are not worn. Also look for cracks and other damage.

9. Check the cartridges for dents or other damage, especially in the threaded part.

Donning Procedure

1. Screw the cartridge into the holder hand-tight so there is a good seal with the gasket in the bottom of the holder, but don't force it. If the cartridge won't go in easily, back it out and try again.

Always use cartridges made by the same manufacturer who made the respirator.

2. Place the facepiece over the bridge of your nose and swing the bottom in so that it rests against your chin.

3. Hold the respirator in place and fasten the top strap over the crown of your head.

4. Fit the respirator on your face and fasten the strap around your neck. Don't twist the straps. Use the metal slide to tighten or loosen the fit, but not too tight.

5. Test the fit by:

   - Lightly covering the exhalation valve with the palm of your hand. Exhale. If there is a leak, you will feel the air on your face.

   - Covering the cartridges with the palms of your hands. Again, don't press too hard. Inhale. The facepiece should collapse against your face.

   - If there is a leak with either test, adjust the headbands or reposition the facepiece and test until no leakage is detected.

<u>Sanitizing Procedure</u>

1. Remove all cartridges, plugs, or seals not affixed to their seats.
2. Remove elastic headbands.
3. Remove exhalation cover.
4. Remove speaking diaphragm or speaking diaphragm/exhalation valve assembly.
5. Remove inhalation valves.
6. Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120° to 140°F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.

7. Remove all parts from the wash water and rinse twice in clean warm water.

8. Air dry parts in a designated clean area.

9. Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign materials.

MONITORING EQUIPMENT INSTRUCTIONS

A. Combustible Gas Indicators (CGIs)/Explosimeters

In addition to the instructions found below, all CGIs should be calibrated prior to use, in an uncontaminated, fresh air environment. Furthermore, units incorporating an aspirator bulb or other air-drawing device should be checked for leaks in the following manner:

- o Attach all hoses, probes, and other air-drawing devices to CGI.
- o Place a finger over probe or hose end.
- o Operate pump or squeeze aspirator bulb.

In a leak-free system, bulb remains collapsed or pump labors. In a leaking system, bulb regains its shape or pump does not labor.

1. MSA Explosimeter Combustible Gas Indicator

   a. Turn explosimeter on by lifting end of "ON-OFF" bar on "RHEOSTAT" knob and rotating "RHEOSTAT" knob clockwise 1/4 turn.

   b. Flush instrument with fresh air by squeezing and releasing aspirator bulb about five times.

   c. Rotate "RHEOSTAT" knob until meter needle rests at zero (Avoid large clockwise rotation, which sends large current through filament, perhaps shortening its useful life.)

   d. To sample, place hose or probe end in atmosphere to be measured and operate aspirator bulb about five times.

   e. Read percent of lower explosive limit (LEL) as meter needle fluctuates from a steady-state level to a higher level each

time the aspirator bulb is flexed. The steady-state reading indicates the "true" value.

f. Turn explosimeter off by lifting end of "ON-OFF" bar on "RHEOSTAT" knob and rotating it counterclockwise until it "clicks." "ON-OFF" bar retracts into "RHEOSTAT" knob.

B. Photoionization Detector

1. Before attaching the probe, check the function switch on the control panel to make sure it is in the off position.

2. Attach the probe by plugging in the 12-pin plug to the interface on the readout module.

3. Turn the 6-position function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale. If not, recharge the battery. If the red indicator comes on, the battery should be recharged.

4. Turn the function switch to any range setting. Look into the end of the probe briefly to see if the lamp is on. If it is on, it will give a purple glow. Do not stare into the probe for any length of time, as UV light can damage your eyes. The instrument is now ready for operation.

5. To zero the instrument, turn the function switch to the standby position and rotate the zero potentiometer until the meter reads zero. Clockwise rotation of the span pot produces a downscale deflection, while counterclockwise rotation yields an upscale deflection. Note: No zero gas is needed, since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.

6. Turn function switch to the 0-20, 0-200, or 0-2000 position.

7. Place probe in the atmosphere to be monitored. If the needle moves to the upper limit of the scale, change the function switch to the next position.

ENVIRONMENTAL SAMPLES

Environmental samples must be packaged and shipped according to the following procedure:

1. Packaging

   a. Place sample container, properly identified and with a sealed lid, in a polyethylene bag, and seal bag.

   b. Place sample in a fiberboard container or metal picnic cooler that has been lined with a large polyethylene bag.

   c. Pack with enough noncombustible, absorbent, cushioning material to minimize the possibility of the container breaking.

   d. Seal large bag.

   e. Seal or close outside container.

   Environmental samples may also be packaged following the procedures outlined later for samples classified as "flammable liquids" or "flammable solids." Requirements for marking, labeling, and shipping papers do not apply.

2. Marking/Labeling

   Sample containers must have a completed sample identification tag, and the outside container must be marked "Environmental Sample." The appropriate side of the container must be marked "This End Up," and arrows should be drawn accordingly. No DOT marking and labeling is required.

3. Shipping Papers

   No DOT shipping papers are required.

4. Transportation

   There are no DOT restrictions of mode of transportation.

3.3 SUBCONTRACTOR INFORMATION

3.3.1 Chemistry Subcontractor

UBTL, Inc.
520 Wakara Way
Salt Lake City, Utah 84108
Telephone: 801/584-3232

3.3.2 Surveying Subcontractor

Jack D. Salo Inc.
15 East First Street
Duluth, Minnesota 55802
Telephone: 218/727-8796

3.3.3 Drilling Subcontractor

Braun Engineering Testing, Inc.
6800 South County Road 18
P. O. Box 35108
Minneapolis, Minnesota 55435-0108
Telephone: 612/941-5600

4.0 CALIBRATION OF FIELD EQUIPMENT

All field equipment will be calibrated according to the manufacturers' specifications, as described below. The personnel assigned to take measurements in the field will assemble as much equipment as feasible in the laboratory prior to mobilization to the site. The personnel will become familiar with the calibration of all instruments, as outlined in the respective manuals, and will make all calibrations that can be made at that time. Pertinent sections of the respective manuals will be photocopied for reference in the field, and all equipment that will be necessary for field calibration, such as buffer solutions and calibration gases, will be assembled.

LIST OF FIELD EQUIPMENT

4.1 Electromagnetics Terrain Conductivity Meter
4.2 Magnetometer
4.3 Metal Locator
4.4 Hand Pump
4.5 Total Organic Vapor Analyzer
4.6 Explosimeter
4.7 Conductivity Meter
4.8 pH Meter
4.9 Thermometer (Thermocouple)
4.10 Bailers
4.11 Decontamination Supplies
4.12 Respirators, Cartridges, and Filters
4.13 Locks

4.1 ELECTROMAGNETICS TERRAIN CONDUCTIVITY METER

The Geonics EM-31D is a one-man instrument consisting of a control unit and transmitter and receiver coils. The system permits measurements of terrain conductivity to be made without the need for direct earth coupling and to an effective depth of exploration of 20 feet. The EM-31D is equipped for output to a digital data logger. The instrument requires no field calibration or adjustment.

Verification of system repeatability is obtained by residing at a calibration station at the start, middle, and end of each survey day. Normally, readings should fall within a range of 10 percent; however, changes in soil moisture content (e.g., following a prolonged period of rain) may affect the natural reading value.

4.2 MAGNETOMETER

The EDA OMNI proton precision magnetometer is a microprocessor-based unit capable of reading total magnetic field intensity and vertical magnetic gradient. The OMNI-IV consists of two parts: one is the reading/recording module, and the other is the sensor. These are interconnected by cable.

Proper system operation is tested at the start of a field investigation and before each field day of recording in accordance with the procedures detailed in the Instrument Operations Manual. Using the "TEST" and "DUMP" modes, the following tests are made:

- o Total field test;
- o Error calculation test; and
- o Software diagnostics.

In the course of the "total field test," approximately 85 percent of the OMNI-IV electronics are tested. As a result of this test, there is an 80 percent probability that the OMNI-IV is operating satisfactorily. Further verification of system performance is obtained by comparing the total field intensity value obtained at the base station with published iso-intensity maps of the total intensity of the earth's magnetic field.

4.3 METAL LOCATOR

The Discovery Electronics TF-600 is a ground-reject metal locator capable of screening out spurious responses produced by metal litter and variations in soil conditions. The TF-600 requires that an instrument nulling procedure be followed to optimize survey results. This is accomplished at the start of a survey using the mode selector and two nulling controls present on the instrument panel, following the procedures prescribed in the Instrument Operations Manual. Frequently, once set, the nulling controls need not be changed throughout the course of the entire survey. As a standard practice, the nulling process is performed at the start of each survey day.

Systems performance is verified by passing the TF-600 over a visible metallic object and noting the tone response of the instrument.

4.4 HAND PUMP

A Brainard-Kilman 1.7-inch hand pump will be used for well development and purging. This is a PVC pump with a 2.75-gpm pumping rate. An external power source is not required to operate this manual pump. The only calibration applicable

for this type of equipment is an initial measurement of the length and internal diameter of the pump piping to confirm the stated volume capacity. Prior to use, the threads and check valve will be inspected to ensure a tight seal. The performance of the "O" ring seal will also be tested. During purging, the evacuated water will be placed in containers to determine the volume of water removed.

4.5 TOTAL ORGANIC VAPOR ANALYZER

The analyzer used will be an HNU Model P1-101. The HNU is a quantitative instrument that measures the total concentration of numerous organic vapors in the air. The instrument is used primarily as a safety or screening device to determine the presence and concentration of organic vapors. The HNU is battery operated and lightweight, making it very useful in actual field monitoring projects. The instrument is calibrated by introducing pressurized gas from a cylinder with a known organic concentration into the detector. Once the concentration has stabilized, the display of the instrument is adjusted to match the known concentration. A calibration of this type is performed prior to each usage of the instrument. If the output differs greatly from the known concentration, the initial procedure to remedy the problem is a thorough cleaning of the instrument. The cleaning process normally removes foreign materials that affect the calibration of the instrument. If this procedure does not remedy the problem, further troubleshooting is performed until the problem is resolved. If the problem cannot be resolved by Dames & Moore technicians, the instrument is returned to the manufacturer for repair.

4.6 EXPLOSIMETER

An MSA Model 2A explosimeter will be used to determine the presence of explosive gases or vapors in ambient air. The instrument is used primarily as a safety device to determine whether the atmosphere contains vapors or gases in sufficient quantities to be explosive. The explosimeter is calibrated by plumbing a small quantity of explosive gases into the instrument and comparing the instrument's output with the known gas concentration. This calibration is performed before each field use. The instrument is cleaned after each field assignment. All components are checked for proper working order and replaced as necessary.

4.7 CONDUCTIVITY METER

A YSI Model 33 S-C-T meter will be used to measure water conductivity. To calibrate, the meter is turned off and the level indicator is adjusted to zero on the readout face. Next, the meter switch is set to "RED LINE" and the level indicator is adjusted to the red line marking on the readout face.

4.8 pH METER

An L. G. Nester Model 47 mini pH meter will be used to measure water pH. The meter has a gel-filled combination electrode so that no reference refilling is required. To calibrate, the electrode is first immersed in a 6.86 pH buffer and the "CALIBRATE" knob is turned until the meter reads 6.86. The electrode is rinsed in distilled water and then immersed in a 4.01 pH buffer. Next, the "TEMP" knob is turned so that the meter reads 4.01, and the span is then adjusted. However, the meter should be calibrated to within 3 pH of the sample value. Therefore, for the 0 to 10 pH range, the meter should be set to read 8.86 and 6.01 versus 6.86 and 4.01 in the calibration procedure. For pH readings in the 4 to 14 range, the meter must be set to read 4.86 and 2.01 in the calibration procedure.

4.9 THERMOMETER (THERMOCOUPLE)

A Fluke Model 80TK will be used to measure the temperature of gases and liquids. This device has a range of -50°C to 1000°C to an accuracy of $\pm$1.0°C. This instrument is calibrated by comparison with a Hewlett-Packard Model 2804A quartz thermometer standard. The calibration is performed by placing the standard's probe and the probe of the thermocouple in identical water baths. The output of the thermocouple is adjusted to correspond with the standard. The calibration is performed once a year but is more frequently checked with respect to other thermometers.

4.10 BAILERS

Teflon® bottom discharge bailers will be used for well sampling. The only calibration applicable for this type of equipment is an initial measurement of the length and internal diameter of the bailer to confirm the stated volume capacity. Prior to use, the threads will be inspected to ensure that connections are tight. The bailer will be inspected for scratches or dents that could also affect the integrity of the equipment. The operation of the discharge mechanism will be tested prior to use. The bailer will be packaged for transport to minimize the effects of jostling.

4.11 DECONTAMINATION SUPPLIES

All sampling equipment will be decontaminated prior to use and between samples to avoid cross-contamination. As specified in the Statement of Work, decontamination supplies will include hexane, laboratory-grade detergent, nitric acid, and distilled water. Certified grade hexane will be used to ensure high purity. Alconox laboratory-grade detergent (Fisher Scientific Company) will be used due to its low sudsing and low residue properties. The final rinsing of equipment will be

done using laboratory-grade distilled deionized water. All decontamination supplies will be transported sealed in unbreakable containers. The containers will be visually inspected for leaks or contamination prior to each use.

4.12 RESPIRATORS, CARTRIDGES, AND FILTERS

Half mask, combination filter/cartridge respirators will be donned by sampling personnel when field situations warrant. The respirators will be fitted with GMA cartridges with Type F filters for removal of organic vapors, dusts, and mists. These are NIOSH (National Institute for Occupational Safety and Health) tested, and NIOSH and MSHA (Mine Safety and Health Administration) approved. The GMA cartridge is approved for use in atmospheres containing at least 19.5 percent oxygen and less than 0.1 percent organic vapors by volume.

4.13 LOCKS

Good quality, reasonably priced padlocks will be placed on each monitor well to discourage tampering and vandalism. The locks will be purchased from a locksmith supplier and will be performance tested at the time of purchase and when placed on a well. The locks will be keyed alike to avoid the possibility of confusion among keys.

5.0 PREVENTIVE MAINTENANCE OF FIELD EQUIPMENT

All field equipment will be maintained according to manufacturers' specifications, as discussed below. As described in Section 4.0, all equipment will be assembled in the laboratory, if feasible, for calibration prior to mobilization. At this time, the equipment will be checked to ensure that it is in proper working order, and any required maintenance will be performed. Tools and equipment that may be needed for field maintenance will be assembled, and pertinent sections of the manuals will be photocopied for reference in the field.

LIST OF FIELD EQUIPMENT REQUIRING PREVENTIVE MAINTENANCE

5.1 Electromagnetics Terrain Conductivity Meter
5.2 Magnetometer
5.3 Metal Locator
5.4 Hand Pump
5.5 Total Organic Vapor Analyzer
5.6 Explosimeter
5.7 Conductivity Meter
5.8 pH Meter
5.9 Thermocouple
5.10 Bailers

5.1 ELECTROMAGNETICS TERRAIN CONDUCTIVITY METER

Field maintenance of the EM-31D and accessory logger consists of the following:

- o Battery replacement when low power is indicated; and
- o Inspection of the data logger interconnect cable and connector for visible evidence of damage.

Verification of stored data validity is obtained by periodic notation of instrument reading and data logger record number for comparison against the printout of the record values following a data dump.

5.2 MAGNETOMETER

Field maintenance of the OMNI-IV normally consists of the following tasks:

- o Replacement of discharged battery pack with freshly charged battery pack when the battery descriptor indicates low power;

- Inspection of sensor cable and battery pack cable (for belt pack) and connectors for visible evidence of damage; and
- Checking the sensor bath fluid level for the presence of an adequate level of fluid as evidenced by a sloshing sound when the sensor is gently shaken.

5.3 METAL LOCATOR

Instrument field maintenance consists solely of battery replacement when the battery indicator meter shows low power.

5.4 HAND PUMP

The hand pump is packed and handled to minimize dents to the piping or damage to the pipe threads or check valve. When stored, the "O" rings should be kept in darkness to prevent deterioration so that a tight seal will be maintained when in use. When in use, it is important that the inner pump cylinder is not jammed down hard or pushed down into the sediment in the bottom of the well. This action has the potential to cause damage to the check valve, "O" ring seal assembly, and/or pump cylinder. A "holding dog" will be used to hold the pump assembly up in the well a safe distance (typically 2 feet) from the sediments at the bottom of the well.

5.5 TOTAL ORGANIC VAPOR ANALYZER

The detector must be kept clean for accurate operation. Foreign materials can be rinsed or wiped off or blown out of the detector. The cord between the analyzer and the recorder should not be wound tightly, and will be visually inspected for integrity before going into the field. A new cord will be ordered from the manufacturer if problems are found. A battery check indicator is included on the equipment and will be checked prior to going into the field and prior to use. The batteries will be charged if found to be weak. The analyzer, probe, and meter are packed securely and handled so as to minimize the chance of damaging parts.

5.6 EXPLOSIMETER

This instrument is cleaned after each field use and is calibrated before each field use. At the time of calibration, all components of the explosimeter are checked for proper working order and are replaced as necessary. Batteries are checked before going into the field and before use and are replaced as necessary. The explosimeter is packed and handled to prevent damage.

5.7 CONDUCTIVITY METER

The conductivity meter and detector are transported in a protective foam-lined case. The cell is tested before going into the field using the test feature and is repaired by the manufacturer as necessary. The contact between the detector and the recorder must be kept clean and can be wiped, rinsed, or blown out. The detector is cleaned with distilled water rinses after each use.

5.8 pH METER

The electrode probe should be kept clean and stored in a protective plastic boot. The probe and meter are packed in a foam-padded case for transport. Prior to use, the batteries are checked by sliding the "BATT CHK" switch to the right and noting whether the dial moves to the green "BATT CHK" area. Extra 9-volt batteries will be on hand in the event the batteries do not check.

5.9 THERMOCOUPLE

The thermocouple is checked annually for accuracy. If erroneous readings are shown during calibration, or suspected while in the field, the thermocouple will be either repaired or replaced. No other preventive maintenance is required except for care during handling.

5.10 BAILERS

The bailers will be visually inspected to ensure that connections are not stripped and that there are no holes or dents. The operation of the check valve will be tested before going into the field and cleaned, repaired, or replaced as necessary.

6.0 FIELD ANALYTICAL PROCEDURES AND DATA REPORTING

6.1 CHEMICAL DATA

Sections 10.3 and 10.4 describe field chemical analysis and sampling for off-site analysis, respectively. Field chemical data, including pH, temperature, conductivity, HNU, and LEL readings, will be tabulated for presentation in the investigation report. Results of chemical analysis by Dames & Moore's subcontractor, UBTL, will be presented as received from the subcontractor. A typical report will include the method used for analysis of each parameter, units, and detection limits. Water and soil quality control reports will accompany the analytical results and will include data on percent recovery on spiked samples (10 percent), duplicate sample analysis (10 percent), and trip and field blank analysis.

6.2 HYDRAULIC DATA

Hydraulic data regarding the glacial aquifer and bedrock aquifer will be obtained from the field program investigation and supplemented with information obtained from the literature review.

6.3 SOIL BORING DATA

Soil boring data will be collected in the field by an experienced Dames & Moore geologist or soils specialist, as described in Section 8.2. During boring operations, lithologic descriptions and stratigraphic logs will be developed. Special emphasis will be placed on field identification of contaminated soils that are encountered. The edited Dames & Moore logs (Figure 8-1) will be included in the appendix of the report, and the significance of soil conditions relative to contaminant migration will be discussed on a site-by-site basis. If a correlation exists between borings, scaled cross sections may be drafted to illustrate these correlations.

6.4 SURVEYING DATA

Surveying data will be presented in the appendix of the report as received from the Dames & Moore surveying subcontractor. The data will include elevations and locations of all wells installed during the field effort using benchmarks traceable to USCGS or USGS survey markers, if available. Elevations of significant bodies of standing water and elevations and locations of preexisting wells will also be included. The survey data, in conjunction with water level measurements (Section 10.1), will be used to construct contour maps of the ground water surface. Individual figures will be drafted for each site showing the locations of monitoring wells, borings, sampling points, known dumping locations, and inferred direction of ground water flow.

6.5 FIELD LOG

A daily field log will be maintained documenting weather conditions during field work and sampling.

7.0 SAMPLE NUMBERING SYSTEM

7.1 PROJECT IDENTIFICATION

The project shall be identified on sample labels as Duluth IAP with assigned Dames & Moore job number for the project.

7.2 SITE IDENTIFICATION

The sites shall be identified according to the following list, which is consistent with the Phase I identification except that the two fire training areas, FT-1 and FT-2, have been consolidated into one site.

1. D-1, Goose Site Dump
2. FT-1 and FT-2, Fire Training Areas
3. S-2, DPDO Storage Area "C"
4. SP-1, Tank Farm Area
5. D-4, South Goose Site Dump
6. D-2, Goose Site Dump
7. D-6, Runway 13 NE Disposal
8. S-1, Old DPDO Storage Area
9. D-9, Disposal Pit
10. RD-1, Low-Level Radioactive Waste Disposal

7.3 SEQUENCE NUMBER

Each sample shall be numbered sequentially as it is logged in the field in the master sample log.

7.4 SAMPLE DEPTH

Identification of soil samples shall include the depth interval (in feet from the ground surface) from which the sample was taken.

7.5 SAMPLE TYPE

The following abbreviations will be used to indicate sample type:

SW = Surface water
W = Ground water
SS = Surface sediment
B = Soil from boring
BW = Soil from well

7.6 EXAMPLES

Sample labels will contain the following information:

D&M Job Number
Location: Duluth IAP
Date
Time
Sampler's Initials
Sample Type
Sample Number

The sample number consists of four to five fields. Field 1 indicates the sample type, as given in Section 7.5. Field 2 indicates the site, as numbered in Section 7.2. Field 3 will be lettered consecutively starting with A for each set of samples of a given type at a given site. Field 4 gives the depth from which the sample was obtained. This field applies only to soil from borings and wells (sample types B and BW). Field 5 (Field 4 for sample types SW, W, and SS) is the sequence number (see Section 7.3).

Example 1: B 9-A, 0-1.5', 53

Field 1:	B	The sample type is a soil from a boring
Field 2:	9	The sample is from Site 9, D-9 Disposal Pit
Field 3:	A	This sample is from the first soil boring drilled at Site 9
Field 4:	0-1.5'	The sample was obtained from a depth of 0 to 1.5 feet
Field 5:	53	This was the 53rd sample to be logged in the master sample log

Example 2: W 3-C, 63

Field 1:	W	The sample type is a ground water sample
Field 2:	3	The sample is from Site 3, S-2 DPDO Storage Area "C"
Field 3:	C	The sample was obtained from the third well drilled at Site 3
Field 4:	63	This was the 63rd sample to be logged in the master sample log

7.7 BLANKS, KNOWNS, SPIKES, SPLITS, AND DUPLICATES

Water sample field blanks, trip blanks, and duplicates will aggregate to an additional 15 percent of the sampling effort. Trip blanks will be prepared by UBTL, the laboratory subcontractor, using field sample collection containers and double distilled/deionized water. The trip blanks will accompany the sample bottles through the entire sampling history. This type of blank permits a determination of the laboratory's cleaning procedures of sample containers; these bottles will remain

sealed until opened for analysis. Field blanks will be prepared in the field with distilled water rinsed through the decontaminated bailer. This type of blank serves as a check on the field cleaning procedures.

Trip blanks and field blanks will be identified using the same numbering system as for standard samples to ensure that no preferential treatment is given to quality control samples. In general, quality control samples will be labeled as such only in the Dames & Moore master sample log, and will be identified by their sequence numbers.

Field duplicate water sampling will also be conducted for quality control purposes. Duplicate samples will be collected by sequentially filling two sample bottles with water from a single sample collection. All duplicate water samples will receive identical treatment, and will be identified using the same numbering system established for standard samples.

Laboratory spiked samples will be prepared and analyzed by UBTL for all chemical analyses performed. Laboratory duplicate analyses will also be performed. The laboratory spiked samples and laboratory duplicate samples will each comprise an additional 10 percent of individual sampling parameters. Results of laboratory spiked samples will be identified by UBTL and labeled with the standard sample numbering sequence, plus an additional identifier denoting that results reported are laboratory spike and duplicate analyses.

8.0 DRILLING AND INSTALLATION OF GROUND WATER MONITOR WELLS

8.1 DRILLING

The choice of drilling methods is influenced by two main factors: (1) the need to minimize the introduction of foreign material that may influence the results of chemical analyses; and (2) the need to penetrate diverse geologic materials.

All borings will be initiated using hollow-stem augers and will be extended by this method to auger refusal or to the required total depth. Data from a previous investigation at the site indicate that till containing abundant boulders may be present. If boulders are encountered, the hole may be moved a few feet and redrilled, or the boulder may be penetrated using diamond core drilling, at the discretion of the field technician. If boulders are encountered at a depth of less than 20 feet, the hole would typically be grouted to the surface and another attempt would be made a few feet away.

8.2 SOIL SAMPLING

Subsurface soil samples will be obtained at 5-foot intervals in borings that will be drilled for the installation of monitor wells. Subsurface soil samples will be obtained at 2½-foot intervals in soil borings. Samples will be obtained using a standard split spoon driven 18 inches using a standard 140-pound hammer.

Each soil sample will be logged in the field by a Dames & Moore geologist or soils specialist. The standard Dames & Moore field drilling log is shown in Figure 8-1. Information recorded on this form includes sample descriptions using the Unified Soil Classification System, boring location, drilling and sampling method, sampling interval, and hammer blows per 6-inch advance of the split spoon. All unusual characteristics, such as discoloration of soil, odor, or air monitoring results, will be noted in the field logs.

Split spoon decontamination and sample shipping are discussed in Sections 11.1 and 12.0, respectively.

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
	DRILLING METHOD:		BORING NO.
			SHEET
	SAMPLING METHOD.		OF
			DRILLING
			START / FINISH

WATER LEVEL					START TIME	FINISH TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

FIGURE 8-1
DAMES & MOORE LOG

[68]

8.3 MONITOR WELL CONSTRUCTION AND COMPLETION

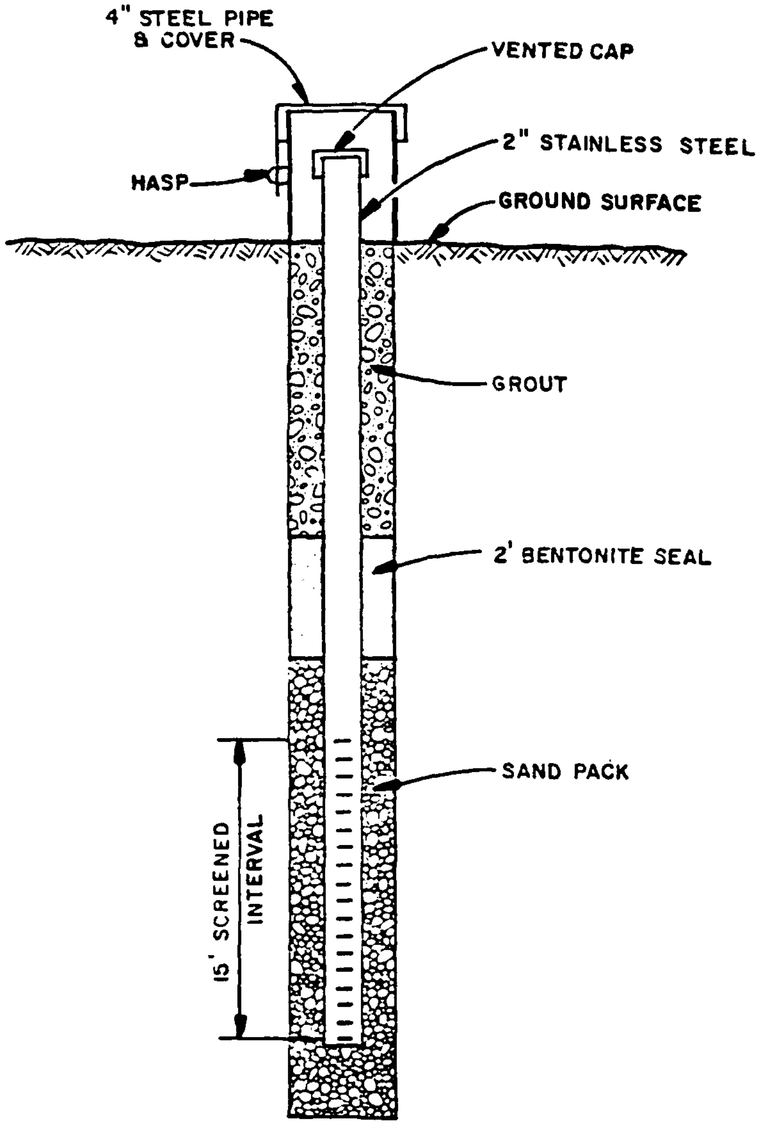
Monitor wells shall be constructed according to Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) guidelines. Two-inch I.D. stainless steel will be used for casing and screen material. A screen slot size of 0.010 inch is considered most appropriate for this site because it is expected that a wide range of grain sizes will be encountered, and this screen size will prevent excessive silting while allowing proper well development. A sand pack will be placed around the well screen using tremie pipes, taking care to ensure that the pack is placed uniformly around the well. In most cases, the sand pack will extend from the bottom of the borehole to approximately 2 feet above the screened section. However, if a confining layer is encountered below the section to be screened, the hole through the confining layer will be grouted to prevent migration of contamination. A bentonite seal with a minimum thickness of 2 feet will be placed above the sand pack. The bentonite, either granulated, pelletized, or slurried, will be tremied in place to ensure a complete seal.

It is anticipated that an average screen length of 15 feet will be used. Actual screen length and depth of setting will depend upon conditions found in the field and will be determined with reference to the following considerations. The screened section should extend 10 feet into the aquifer of interest and 5 feet above the water table to allow for fluctuations in water table elevation. This may not be possible in locations where the depth to the water table is less than 3 to 5 feet because of the requirements for grouting the annulus to prevent seepage of surface water into the well. A neat cement grout containing less than 2 percent bentonite will be placed in the annulus around the well casing from a depth of 1 to 2 feet above the well screen to the surface.

A protective steel collar with locking cap shall be cemented in place over the stainless steel casing to prevent damage to the well. The wells will be seated in a 16- by 16- by 4-inch concrete surface pad. If the well is located in an area frequented by vehicular traffic, three steel posts will be placed around the well. Each well will be permanently labeled with its assigned number. Typical well construction is illustrated in Figure 8-2.

8.4 WELL DEVELOPMENT

All wells will be developed after completion to insure that relatively sediment-free water samples can be obtained. The method of development will depend upon the equipment available, but methods involving a foreign source of water will not be used. Air-lift pumping or mechanical surging with a bailer may be used.



(NOT TO SCALE)

FIGURE 8-2

TYPICAL MONITORING WELL INSTALLATION

8.5 GEOPHYSICAL LOGGING

Geophysical logging of borings will not be performed at Duluth IAP because the heterogeneous nature of the geologic material present at the site will make the logs difficult to interpret and because the close spacing of split spoon samples will provide adequate information.

9.0 PUMP TEST

Pump tests, per se, will not be conducted during this investigation.

10.0 GROUND WATER MONITORING AND SAMPLING

10.1 GROUND WATER LEVEL MEASUREMENT

The depth to ground water will be measured in each well from the top of the stainless steel casing. This measurement will be made to the closest 0.01 foot using a ploper device or an electronic water level indicator. The distance from the top of the stainless steel casing to the ground surface will be recorded to the nearest 0.1 foot.

Water levels will be measured once each day on 3 consecutive days of the field effort in each well. These triplicate measurements will be useful for confirming that the wells have stabilized, or for recognizing the magnitude of short-term ground water fluctuations.

10.2 SURVEYING OF WELLS

In order to establish ground water flow patterns, a survey will be made of all newly installed monitor wells and of key surface water elevations. The elevations of the top of the stainless steel casing will be measured to an accuracy of 0.01 foot, and horizontal locations will be accurate to 1 foot. The survey will be tied to a reference datum point (base benchmark) and will be traceable to a USCGS/USGS survey marker.

10.3 ON-SITE ANALYSIS

Before water samples are collected for shipment to the laboratory, and after the wells have stabilized, a separate water sample from each well and surface water sampling location will be analyzed in the field for pH, conductivity, temperature, and color. Meters will be calibrated and maintained as described in Sections 4.0 and 5.0. The pH meter will be calibrated before each set of measurements using standard buffer solutions. Calibration of the thermometer and the conductivity meter will be checked in the laboratory before commencement of the field effort. All instrument probes will be rinsed with distilled water between measurements. The sample will be placed in a clean container against a white background when determining color. Since temperature can affect conductivity and pH readings, all measurements will be taken consecutively on the same sample. Precautions will be taken to obtain a representative sample as described in Section 10.4.

Soil samples will be monitored in the field for organic vapors using an HNU photoionization meter or an organic vapor analyzer (OVA). The readings will be taken immediately after opening the split spoon and will be recorded directly on the boring logs. The boreholes will be monitored with both the HNU and the explosimeter during drilling.

10.4 SAMPLING FOR OFF-SITE ANALYSIS

Ground water samples will be obtained from monitor wells after proper well development (Section 8.4) using a Teflon bailer. Prior to sample collection, a stabilization test will be performed on each well to ensure that standing water in the well casing has been removed and that the sample will be representative of the aquifer. To perform the test, the well will be air-lift pumped or bailed while monitoring the pH, temperature, and specific conductance of the discharge. When three successive readings (taken at intervals of one well volume) give equivalent values, the well is considered to have stabilized. Values are considered stabilized by the MPCA if they fall within the following ranges:

Specific conductance (temperature corrected): $\pm$ 10 µmhos/cm
pH: $\pm$ 0.1 pH unit
Temperature: $\pm$ 0.5°C

A form to be filled out during the stabilization test is given in Figure 10-1. The sample will be transferred directly from the bailer to the sample container supplied by the laboratory. Turbulence will be minimized during the transfer operation to prevent the loss of volatile organics. Containers will be filled to capacity to minimize the loss of volatile constituents to the head space.

Surface water samples will be obtained by grab sampling. Since the shipping containers provided by the laboratory will contain preservatives, a separate sampling container will be used to collect the sample and prevent the loss of the preservative. The sampling device will be decontaminated between samples, as described in Section 11.4, and will be rinsed with the water to be sampled immediately before sampling.

Subsurface soil samples will be obtained using standard split spoon methods, as described in Section 8.2. After the sample has been logged, a stainless steel spoon will be used to transfer the sample to a glass sample jar with a Teflon-lined cap. As much of the sample as possible will be placed in the jar, but if the jar does not have the capacity, the greatest concentration of contamination, as indicated by visual examination or HNU readings, will be selectively collected.

Surface soil samples will be collected in a similar manner, using a stainless steel sampling spoon or spade.

Sediment samples from the ponds near the Goose site dumps will be collected using a drop corer device or an Ekman dredge. The sampler will be operated from a boat or through holes cored in the ice, depending on site conditions at the time of the field effort.

FIGURE 10-1

STABILIZATION TEST

PARAMETER	WELL VOLUME EXTRACTED									
	1	2	3	4	5	6	7	8	9	10
Specific conductance (temperature corrected) $\pm$ 10 μmhos/cm										
pH: $\pm$ 0.1 pH unit										
Temperature: $\pm$ 0.5°C										
Color										
Odor of Discharge										

11.0 DECONTAMINATION PROCEDURES

11.1 DRILLING, SOIL SAMPLING, AND MONITOR WELL INSTALLATION

Precautions will be taken not to introduce contaminants into the well during drilling and well installation. The rear end of the drill rig, augers, and rods will be steam cleaned between holes except in the case where the hole is moved only a short distance because of refusal on boulders.

Split spoon samplers will be decontaminated after each sample according to the following procedure:

1. Wash with laboratory-grade detergent; and
2. Rinse three times with distilled water, the final rinse with reagent-grade water.

Where field conditions warrant more extensive decontamination procedures, the following will be employed:

1. Wash with detergent, rinse with distilled water;
2. Wash with hexane, rinse with distilled water; and
3. Wash with dilute nitric acid, rinse three times with distilled water, the final rinse with reagent-grade water.

11.2 WELL DEVELOPMENT

Wells will be developed by bailing or by air-lift or hand pumping, as described in Section 8.4. Any part of the air-lift equipment, hand pump, or Teflon bailer that is placed down the hole will be decontaminated after developing each well using the following procedure:

1. Wash with laboratory-grade detergent, rinse with distilled water; and
2. Rinse three times with distilled water, the final rinse with reagent-grade water.

Where field conditions warrant, the more extensive decontamination procedure outlined above will be followed.

11.3 WATER LEVEL MEASUREMENT

The probe used for water level measurements will be decontaminated between wells by rinsing with distilled water. Full decontamination procedures, described in Section 11.1, will be used if the probe or line becomes exposed to observed high concentrations of contaminants.

11.4 WATER SAMPLING

Water samples will be obtained by bailing using a Teflon bailer on a dedicated monofilament line, as described in Section 10.4. The bailer will be decontaminated between wells as described above.

11.5 SEDIMENT SAMPLING

Sediment sampling devices, including stainless steel spoons, shovels, and drop samplers, shall be decontaminated after collection of each sample using the same procedures as for split spoon samplers, described in Section 11.1.

11.6 PERSONNEL DECONTAMINATION

A personnel decontamination station shall be established at a location approved by base personnel. Persons working on the site shall report to the station for decontamination before leaving the base. In most instances, removal of protective clothing will suffice for decontamination. The station will have facilities for storage of reusable protective clothing and for the disposal of clothing contaminated beyond reuse. Also, facilities for decontaminating hands, boots, and gloves, consisting of detergent wash and tap water rinse, shall be provided. Facilities for sanitizing respirators using manufacturers' instructions shall be provided.

11.7 SAMPLE HANDLING

Samples will be handled by personnel wearing nitrile gloves to avoid contamination. The sample containers will be well cushioned with packing materials when they are placed in the insulated cooling chests for transportation to the laboratories. Care will be taken to seal bottle/vial caps tightly. Extra insurance against opening in transit will be provided by sealing the caps with filament tape for medium concentration samples.

12.0 SAMPLE HANDLING AND PACKAGING

12.1 SPLIT SAMPLE PROCEDURES

In order for split sample analysis to be valid, the split sample must be as homogeneous as possible. Split spoon samples should be split vertically so that vertical stratification of contaminants will be equally distributed between the samples.

Split ground water samples will be collected at the same time using the same bailer. MPCA personnel may participate in split sample acquisition. Half the bailer volume will be poured into each jar until the jars are full. Sample containers, preservatives, and handling will be identical for each member of the split sample.

12.2 SAMPLE CONTAINERS

Sample containers will be provided by UBTL. The containers will be either plastic or glass with Teflon-lined lids and will be pretreated with the preservatives listed in Table 12-1 (taken from Sabel and Clark, 1985).

12.3 SAMPLE HANDLING AND DECONTAMINATION

After collection in the field, all samples will be brought to an area adjacent to the personnel decontamination area for decontamination of sample containers. The sample containers will be handled with gloves until decontaminated with a detergent wash and tap water rinse if spills have occurred on the outside of the container. Care must be taken to avoid damaging the label during decontamination. The samples will be stored on ice and will be shipped to the laboratory at the end of each day's sampling via overnight delivery.

12.4 PROCEDURES FOR PACKING LOW CONCENTRATION SAMPLES

Packing procedures will follow recommendations given in the USEPA manual, "Field Monitoring and Sampling of Hazardous Materials," Section 2, Part 5 (January 1983), as described for environmental samples, which are those samples obtained from upgradient and downgradient of the site (not at the actual site) and do not have any indications of gross contamination. These samples will be packaged as follows:

- o Place the labeled and sealed sample container in a polyethylene bag and seal the bag;

TABLE 12-1

SAMPLE HANDLING PROCEDURES

Parameter	Container[a]	Preservative[b,c]	Maximum Holding Time[d]
Metals[e]			
(except Cr^{+6} and Hg)	P, G	HNO_3 to pH < 2	6 months
Mercury	P, G	HNO_3 to pH < 2	28 days
Petroleum Hydrocarbons	G	Cool, 4°C; H_2SO_4 to pH < 2	28 days
Organic Tests[f]			
Purgeable halocarbons	G, Teflon-lined septum	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]	14 days
Purgeable aromatics	G, Teflon-lined septum	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]; HCl to pH < 2[h]	14 days
Acrolein and acrylonitrile	G, Teflon-lined septum	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]; adjust pH to 4-5[i]	14 days
Phenols	G, Teflon-lined septum	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]	7 days until extraction, 40 days after extraction
Benzidines	G, Teflon-lined septum	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]	7 days until extraction, 40 days after extraction
Phthalate esters	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Nitrosamines[j]	G, Teflon-lined cap	Cool, 4°C; store in dark; 0.008% $Na_2S_2O_3$[g]	7 days until extraction, 40 days after extraction

TABLE 12-1 (continued)

Parameter	Container[a]	Preservative[b,c]	Maximum Holding Time[d]
PCBs	G, Teflon-lined cap	Cool, 4°C; pH 5-9	7 days until extraction, 40 days after extraction
Nitroaromatics and isophorone	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
Polynuclear aromatic hydrocarbons	G, Teflon-lined cap	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]; store in dark	7 days until extraction, 40 days after extraction
Haloethers	G, Teflon-lined cap	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]	7 days until extraction, 40 days after extraction
Chlorinated hydrocarbons	G, Teflon-lined cap	Cool, 4°C	7 days until extraction, 40 days after extraction
TCDD	G, Teflon-lined cap	Cool, 4°C; 0.008% $Na_2S_2O_3$[g]	7 days until extraction, 40 days after extraction
<u>Pesticides Test</u>			
Pesticides	G, Teflon-lined septum	Cool, 4°C; pH 5-9[k]	7 days until extraction, 40 days after extraction
<u>Radiological Tests</u>			
Alpha, beta and radium	P, G	HNO_3 to pH < 2	6 months

TABLE 12-1 (continued)

[a]Polyethylene (P) or glass (G).

[b]Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

[c]When any sample is to be shipped by common carrier or sent through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of this section, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: hydrochloric acid (HCl) in water solutions at concentrations of 0.04% or less by weight (pH about 1.96 or greater); nitric acid (HNO_3) in water solutions at concentrations of 0.15% or less by weight (pH about 1.62 or greater); sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% or less by weight (pH about 1.15 or greater); and sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% or less by weight (pH about 12.30 or less).

[d]Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer time. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

[e]Samples should be filtered immediately on site before adding preservatives for dissolved metals.

[f]Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

[g]Should only be used in the presence of residual chlorine.

[h]Sample receiving no pH adjustment must be analyzed within 7 days of sampling.

[i]Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

[j]For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

[k]The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

Reference: Sabel and Clark, 1985.

- Place the sample in a metal or plastic picnic cooler containing a waterproof container of ice or an ice substitute and dividers to keep sample jars separated to minimize the possibility of breakage; and

- Seal the cooler with the latch and with packaging tape.

12.5 PROCEDURES FOR PACKING MEDIUM CONCENTRATION SAMPLES

Medium concentration samples will be packed in the same manner as described in Section 12.4 for low concentration samples. However, an effort will be made to identify, by visual examination in the field, any samples suspected of having elevated contaminant concentrations. These samples will be segregated and packed in a separate container, to the extent allowed by prevailing field conditions. Containers for these samples will be sealed with tape in addition to the normal processing used on all samples collected.

13.0 SAMPLE CUSTODY AND DOCUMENTATION

13.1 SAMPLE IDENTIFICATION DOCUMENTS

Each sample shall be identified using the sample numbering system described in Section 7.0. A label on each sample container will contain the following information:

- o Dames & Moore Job Number
- o Location of Collection
- o Time of Collection
- o Date of Collection
- o Sample Type
- o Sampler's Initials
- o Purpose of Sample
- o Preservatives Used

At the end of each day's sampling effort, and before the samples are shipped to the analytical laboratory, this information will be recorded in the master sample log. Each sample will be assigned a unique sequence number, to be recorded both in the log and on the label, that will be used to identify the samples and to correlate with laboratory sample numbers assigned by UBTL.

13.2 CHAIN-OF CUSTODY RECORDS

A sample chain-of-custody form to be used during this investigation is illustrated in Figure 13-1. Chain-of-custody procedures will be followed so that the possession of a sample can be traced from the time of collection until the data are used in legal proceedings. One or more chain-of-custody forms will accompany each set of samples shipped from the site. Each time the custody of the samples is transferred, the form is signed by both the person relinquishing and the person receiving the samples. A copy of the form will be retained by the sampler, who will fill in the information on sample identity and who will also be the first person to relinquish the sample. If the sample containers appear to have been opened or tampered with, this should be noted by the person receiving the samples under the section entitled "Remarks."

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client						Field Personnel (Signature)
Project Title					Job No.	
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

FIGURE 13-1
DAMES & MOORE
CHAIN-OF-CUSTODY RECORD

13.3 FIELD LOG BOOKS

Each Dames & Moore professional shall maintain a personal field log book while on the site. Information recorded in the log book shall be written in an objective, factual manner so that persons reading the entries will be able to determine the sequence of events as they occurred in the field. If notes are made in the log book by someone other than the owner of the book, this should be indicated by the writer's signature and date. Information to be recorded in the field log book will include:

- Date and time of entry;
- Sample number;
- Sample description;
- Method of sampling;
- Location of sampling;
- Sketch of sample location;
- Field measurements such as pH, conductivity, HNU, and temperature;
- Names and phone numbers of field contacts, drillers, and persons on site;
- Materials used in well construction;
- Driller's standby and drilling time; and
- Weather and field conditions during drilling and sampling.

In addition to the above information, the following forms will be used to record detailed data:

- Dames & Moore Boring Log (Figure 8-1) - used in the field to record detailed sample descriptions and drilling methods;
- Field Memorandum (Figure 13-2) - used to outline daily activities for information of project manager and file records; and
- Monitor Well Detail Information Sheet (Figure 13-3) - used to record details of well installation.

Other forms are described in appropriate sections of this plan.

13.4 CORRECTIONS TO DOCUMENTATION

Any errors or mistakes in original field data shall be crossed out with a single line, and the person making the correction shall initial it. No data shall be erased.

ACTION	INFO	
To:		File:
		X-Ref:
		Date:

From: Reply Required By:

Subject:

Reference(s):

ROUTING

FIGURE 13-2
DAMES & MOORE
FIELD MEMORANDUM

Dames & Moore

114.8 (REV. 5-68)

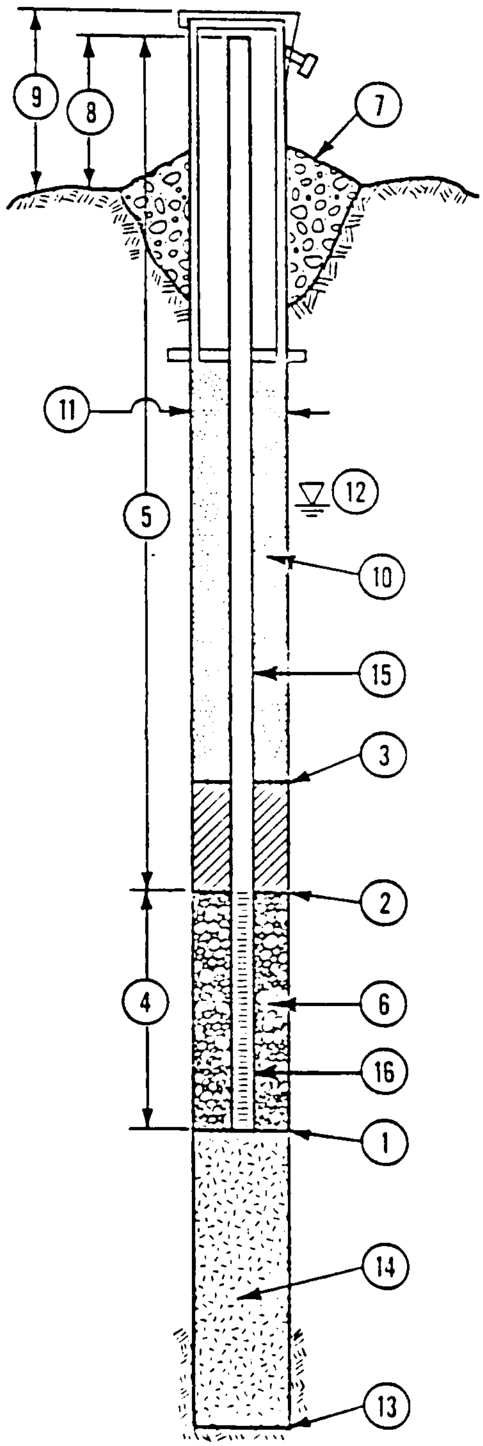
PIEZOMETER DETAIL INFORMATION SHEET

GROUND SURFACE ELEVATION ______________ JOB NUMBER ______________

TOP OF WELL CASING ELEVATION ______________ BORING NUMBER ______________

DATE ______________

LOCATION ______________



1. DEPTH TO BOTTOM OF WELL POINT OR SLOTTED PIPE ______________ FEET. *
2. DEPTH TO BOTTOM OF SEAL (IF INSTALLED) ______________ FEET. *
3. DEPTH TO TOP OF SEAL (IF INSTALLED) ______________ FEET. *
4. LENGTH OF WELL SCREEN ______________ FEET. SLOT SIZE ______________.
5. TOTAL LENGTH OF PIPE ______________ FEET AT ________ INCH DIAMETER.
6. TYPE OF PACK AROUND WELL POINT OR SLOTTED PIPE ______________.
7. CONCRETE CAP. YES NO (CIRCLE ONE)
8. HEIGHT OF WELL CASING ABOVE GROUND ______________ FEET.
9. PROTECTIVE CASING? YES NO (CIRCLE ONE)
   HEIGHT ABOVE GROUND ______________ FEET.
   LOCKING CAP? YES NO (CIRCLE ONE)
10. TYPE OF UPPER BACKFILL ______________.
11. BOREHOLE DIAMETER ______________ INCHES.
12. DEPTH TO GROUND WATER ______________ FEET. *
13. TOTAL DEPTH OF BOREHOLE ______________ FEET. *
14. TYPE OF LOWER BACKFILL ______________.
15. PIPE MATERIAL ______________.
16. SCREEN MATERIAL ______________.

*(DEPTH FROM GROUND SURFACE)

FIGURE 13-3
PIEZOMETER INSTALLATION DETAILS

[87]

Dames & Moore

In some circumstances, original documents may be transcribed, making appropriate changes and eliminating errors. In these cases, the successive documents shall be dated and numbered as sequential drafts.

13.5 TRAFFIC REPORTS

Knowledge of sample status will be maintained through review and evaluation of Dames & Moore field engineer reports, discussions with field personnel, and through contact with UBTL on a periodic basis. In this way, a working knowledge of sample traffic will be available through the project.

13.6 SHIPPING OF SAMPLES

Samples will be shipped at the end of each day's sampling efforts via overnight delivery to UBTL and OEHL. Sample packing procedures are given in Section 12.4.

14.0 SITE CLEANUP

A certain amount of trash will be generated from site investigation activities, including protective clothing, gloves, and cement bags. This material, assuming it has not been contaminated, will be disposed of in the proper locations (dumpsters, rubbish disposal areas) on site. Each site will be policed after completion of activities to ensure that no trash remains.

Soil wastes will be generated from drilling activities, but because drilling will not be conducted directly in the areas of dumping, it is expected that the soil will have only very low concentrations of contaminants. The soil from each hole will be monitored with the HNU and explosimeter. Any soil showing an organic vapor reading of less than 50 ppm and an LEL reading of less than 25 percent and having no unusual colors or odors will be considered uncontaminated and will be disposed of by spreading on site. Samples exceeding these criteria will be sealed in new 55-gallon drums. The same criteria will be used to determine if protective clothing has been contaminated. Any such contaminated clothing will be drummed along with the soil. The drums will become the temporary property of the base.

The suspected contaminated waste will be tested for EP Toxicity and ignitability. Dames & Moore shall be responsible for transporting drums containing suspected contaminated soils. Dames & Moore shall be responsible for the ultimate disposal of contaminated soils in accordance with current federal, state, and/or local hazardous waste disposal laws. Dames & Moore shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact referenced in paragraph V for those borehole cuttings obtained from TAC sites (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).

15.0 FIELD TEAM ORGANIZATION AND RESPONSIBILITIES

15.1 ORGANIZATION

The Dames & Moore project organization for the Phase II, Stage 2 investigation at Duluth IAP will be as follows:

- Project Director: Mr. Glenn D. Martin, Managing Principal-in-Charge
- Principal Investigator: Mr. Michael W. Ander, Associate
- Project Manager: Ms. Carol J. Scholl, Staff Geologist
- Principal Staff Assistant: Ms. Beverly J. Harper, Environmental Scientist
- Field Manager: Ms. Amy D. Lamborg, Assistant Geologist
- Geophysicist: Mr. Thomas E. Jensen, Senior Geophysicist

A number of additional Dames & Moore staff level personnel will assist in field operations, data interpretation and report preparation as necessary.

15.2 RESPONSIBILITIES

Responsibilities for the individuals identified in Section 15.1 will be as follows:

- Project Director -- Responsible for overall project direction and surveillance.
- Principal Investigator -- The primary point of contact with OEHL and other Dames & Moore personnel, and the principal senior investigator responsible for project technical activities.
- Project Manager -- Assistant to Principal Investigator in project management and a secondary point of contact with OEHL. Responsible for technical oversight of all project chemistry activities during data collection and analysis.
- Principal Staff Assistant -- Assistant to Principal Investigator and Project Manager in project management, coordination, and operation.
- Field Manager -- Responsible for organization and direction of field investigations. Will mobilize "the field" team, to include Dames & Moore assistant professionals or technicians and drilling and surveying subcontractors. Will stake locations of all sampling points and boring locations in consultation with the OEHL manager and the Project Director,

review the site safety plan with site personnel, and monitor the initial drilling activities. In addition, will be responsible for proper recording and transmittal of field records, and shipment of samples to UBTL for analysis.

- **Geophysicist** — Will conduct all site geophysical surveys and be responsible for all geophysical data interpretation and analysis.

15.3 TRAINING

15.3.1 Dames & Moore Personnel

The Dames & Moore personnel of staff level and above to be utilized on this job all have professional degrees in relevant fields, and previous experience in similar types of investigations. All field personnel will be thoroughly briefed on the appropriate safety measures specific to work on this project, and will have received safety training in accordance with Dames & Moore's firmwide Health and Safety Program.

15.3.2 Subcontractors

All site subcontractors will be thoroughly briefed on the following key aspects of project work:

- Project scope of work pertaining to the subcontractor's anticipated role;
- Site Health and Safety Considerations; and
- Timetable, cost, and other limitations pertinent to successful completion of the project within contractual scope.

Subcontractors selected will be experienced in related types of investigation, and have a demonstrated technical ability to complete their designated tasks.

16.0 SCHEDULE

Dames & Moore would be in a position to commence field work on this project within 4 weeks of receipt of the Work Order for Phase II, Stage 2. Figure 16-1 presents the milestone chart of the proposed schedule. The schedule assumes that drilling will commence immediately upon completion of the geophysical investigation. The project duration from time of receipt of the Work Order to submittal of the draft report is estimated to be 18 weeks (i.e., submittal of the first draft to USAFOEHL the week of January 26, 1987). It is anticipated that subsequent drafts will be submitted 4 weeks after receipt of review comments.

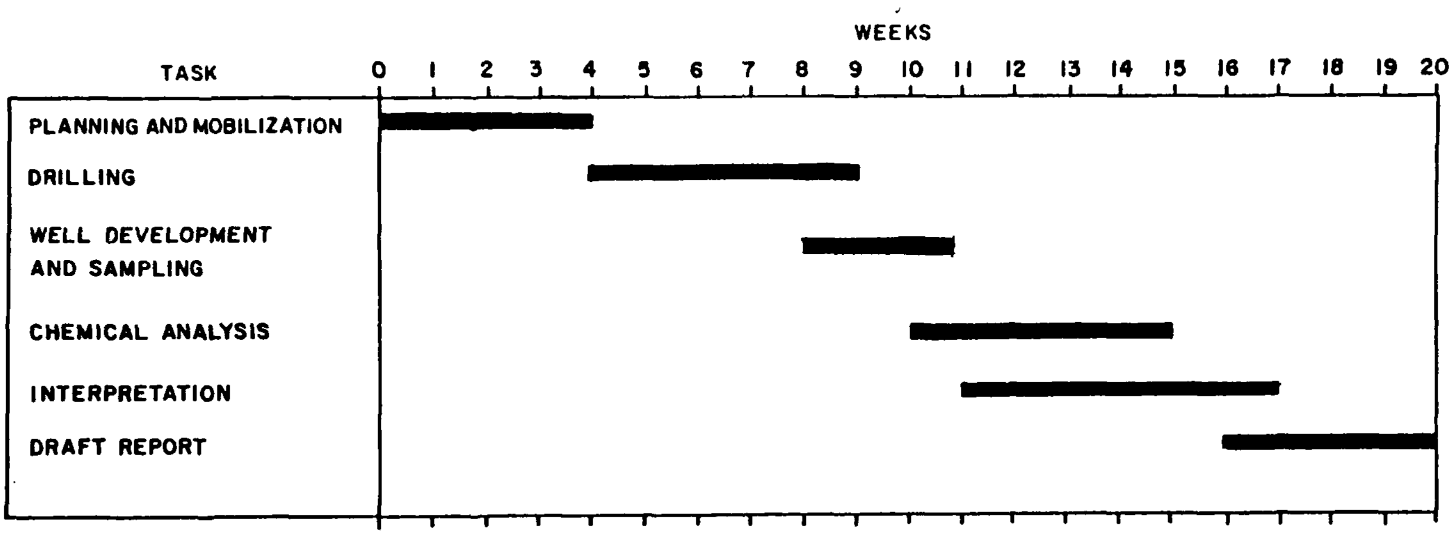


FIGURE 16-1

PROPOSED SCHEDULE FOR PHASE II STAGE 2 INVESTIGATION AT DULUTH IAP, MINNESOTA

Dames & Moore

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APPENDIX A

HEALTH AND SAFETY PLAN
(SEE SECTION 3.2)

APPENDIX B

STATEMENT OF WORK

Installation Restoration Program
Phase II - Stage 2
Duluth International Airport Minnesota

I. DESCRIPTION OF WORK

The objective of IRP Phase II investigations is to identify contaminants and then define the magnitude, extent, direction and rate of movement of identified contaminants. A series of staged field studies may be required to meet this objective.

The Phase II Stage 2 effort at Duluth IAP will entail a follow-on investigation for five sites evaluated during Phase II, Stage 1, and an initial monitoring program at six additional sites. The sites which are included in this study are identified in Table 1 and can be located on an installation map, Figure 1. The sites to receive follow-on investigative work are Goose Dump 1, Fire Training Areas, DPDO Storage Area "C" and the Tank Farm Area.

The purpose of this effort at Duluth IAP is to: (1) confirm the presence or absence of contamination within the specifed areas of investigation; (2) if contamination exists, determine the magnitude of contamination, and the potential for and rate of migration of those contaminants in the various environmental media; (3) identify potential environmental and health risk consequences of migrating pollutants; and (4) recommend additional investigations necessary to further define the magnitude, extent, direction and rate of contaminant migration.

The Phase I and the Phase II Stage 1 IRP Reports (mailed under separate cover) incorporate the background and description of the sites included in this task. To accomplish this survey effort, take the following actions:

A. General

1. Monitor all borehole and well drilling with a photoionization meter or equivalent organic vapor detector to identify the potential generation of hazardous and/or toxic vapors or gases. Include air monitoring results in the boring logs. If soil encountered during drilling or test pit work is suspected to be hazardous because of discoloration, odor or air monitoring, containerize the soil cuttings in new, unused drums. Enter into the boring logs the depth(s) from which suspected contaminated soil cuttings were collected. Test each drum containing suspected contaminated soils by taking a composite sample. Collect a maximum of 15 composite samples and test them for EP Toxicity and Ignitibility. (Ref: 40 CFR Subpart C., 261.21 - Ignitibility and 261.24 - EP Toxicity).

2. Determine the exact field location of all boreholes and monitor wells during the planning/mobilization phase of the field investigation. Consult with base personnel to minimize disruption of base activities, to properly position boreholes with respect to exact locations of spill/leak sites, and to avoid underground utilities. The senior on-site contract representative, in consultation with the USAF OEHL project manager and the base point-of-contact (see Section V), establishes the final borehole and well locations. Direct all drilling and sampling operations and maintain a detailed log of the conditions and materials penetrated during the course of the work.

TABLE 1

LISTING OF SITES

SITE NO.	PHASE I NO.	SITE DESCRIPTION
1	D-1 (TAC)	Goose Dump 1
2	FT-1 and FT-2 (ANG)	Fire Training Areas
3	S-2 (ANG)	DPDO Storage Area "C"
4	SP-1 (ANG)	Tank Farm Area
5	D-4 (TAC)	South Goose Dump
6	D-2 (TAC)	Goose Dump 2
7	D-6 (TAC)	Runway 13 NE Disposal
8	S-1 (ANG)	Old DPDO Storage Area
9	D-9 (TAC)	Disposal Pit
10	RD-1 (ANG)	Low-Level Radioactive Waste Disposal

NOTE: ANG: Air National Guard sites
TAC: Tactical Air Command sites

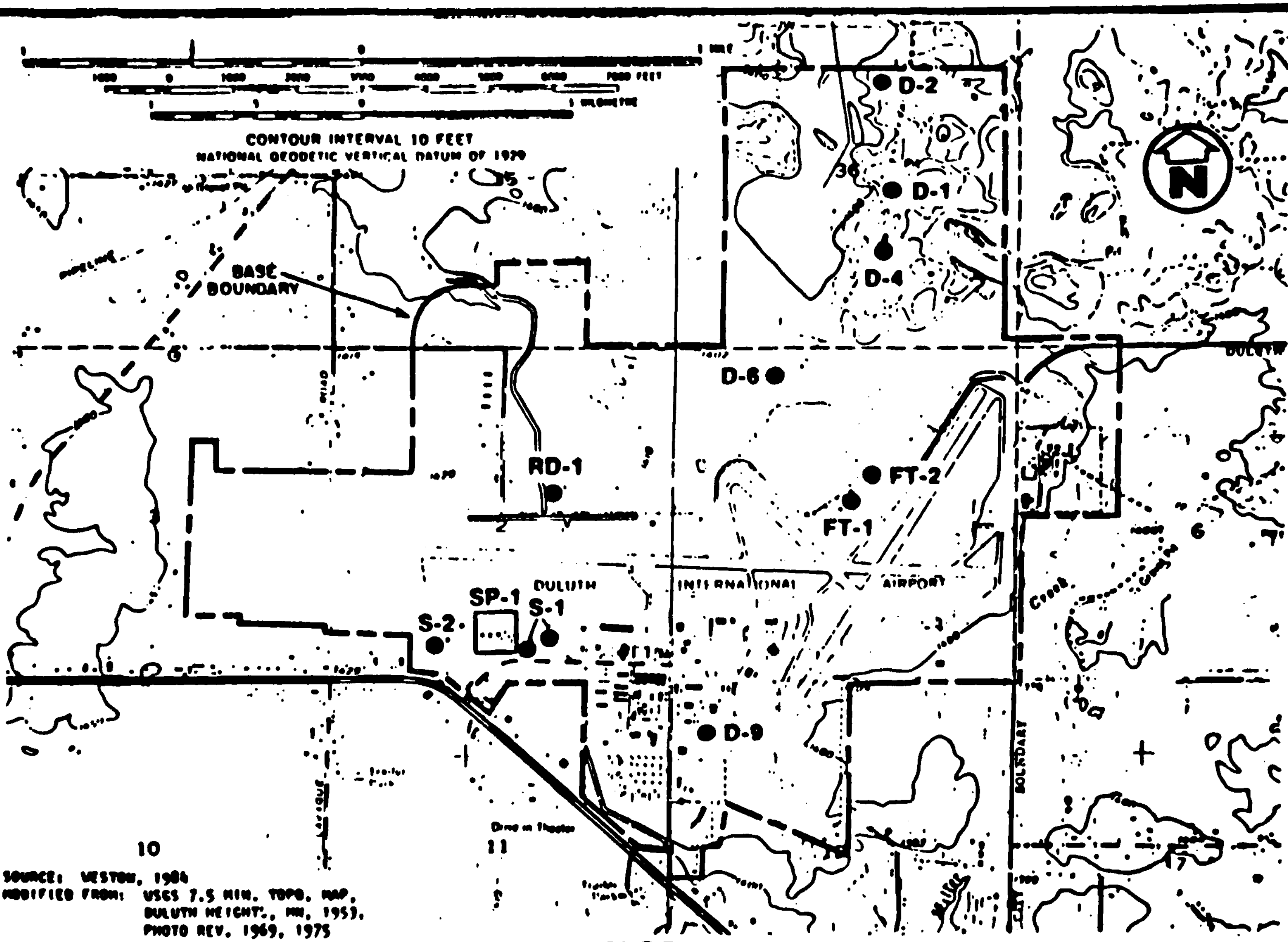

FIGURE 1
LOCATIONS OF ALL POTENTIAL SOURCES OF CONTAMINATION
RECEIVING PHASE I HARM SCORE RANKINGS

3. Provide on site analysis of pH, temperature, and specific conductance for all water samples collected. Comply with the following references concerning sample collection, maximum holding time, sample preservation, etc: Standard Methods for the Examination of Water and Wastewater, 16th Ed. (1985), pp. 37-44; ASTM, Section 11, Water and Environmental Technology; Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057; Methods for Chemical Analysis of Waters and Wastes, EPA Manual 600/4-79-020, pp. xiii to xix (1983); and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd Ed. (USEPA, 1984). Meet the required detection limits of the applicable EPA method identified in Table 4 for all water and soil chemical analyses.

4. Determine the areal extent of the sites by reviewing available aerial photos of the base, both historical and the most recent panchromatic and infrared. Report the sources of this data.

5. Split all water and soil samples. One set of samples shall be analyzed by the contractor and the other set of samples shall be delivered immediately (the same collection day) to the field government Point Of Contact (POC). The field POC will select 10% of the split samples for subsequent shipment and analysis and deliver them to the contractor within 24 hours of receipt. The contractor shall supply all packing and shipping materials for the field POC's use in packaging the split samples. The contractor shall accept from the field POC the packaged samples for immediate shipment (within 24 hours) for analysis through overnight delivery to:

USAFOEHL/SA
Bldg 140
Brooks AFB TX 78235-5501

Include the following information with samples sent to the USAF OEHL:

a. Purpose of sample (analyte)

b. Installation name (Base)

c. Sample number (on container)

d. Source/location of sample

e. Contract Task Numbers and Title of Project

f. Method of collection (bailer, suction pump, air-lift pump, etc)

g. Volumes removed before sample taken

h. Special Conditions (use of surrogate standard, etc.)

i. Preservatives used (indicate if nonstandard)

j. Date and time of sampling

k. Sampler's name

Forward this information with each sample by properly completing an AF

Form 2752A "Environmental Sampling Data" and/or AF Form 2752B "Environmental Sampling Data-Trace Organics," mailed under separate cover. Label each sample container to reflect the data in (a), (b), (c), (i), (j), and (k) above. In addition, attach copies of field logs which document sample collection.

Complete and maintain chain-of-custody records for all samples, field blanks, and quality control duplicates.

6. Install groundwater monitor wells using the following specifications:

a. Comply with the U.S. EPA Publication 330/9-S1-002, NEIC Manual for Ground Water /Subsurface Investigations at Hazardous Waste Sites for monitor well installation. Also comply with state and local regulatory agency requirements concerning well drilling, development and purging, and groundwater sampling methods.

b. Drill each well using conventional hollow-stem auger techniques. Where refusal is encountered due to boulders before the required well completion depth is achieved, use diamond core drilling to complete the borehole. Take samples for stratigraphic description and logging at five-foot intervals using standard split spoon techniques. Include each pilot boring log and well completion summary in the Final Report (as specified in Item VI below).

c. Collect soil samples for laboratory analysis from well boreholes as directed in section B. Where the depths and/or boreholes from which soil samples should be collected at a site are not specified in Section B, actual sample locations (borehole and depth) are at the field supervisor's discretion; however, samples should be limited to areas of suspected contamination. At sites where soil samples are specified in Section B to be collected from designated boreholes and at certain depths, variations may occur at the field supervisors discretion to ensure zones of suspected contamination are sampled. Do not collect or analyze more soil samples than authorized in Section B.

d. Install wells at a sufficient depth to collect samples representative of aquifer quality and to intercept floating contaminants. Develop each well as soon as practical after completion by surging with an air-lift pump or bailer. Do not introduce foreign materials into the well during development. Continue well development until the discharge water is clear and free of sediment to the fullest extent possible, and the pH, temperature and specific conductance have stablized.

e. Construct a maximum of 30 wells using two-inch inside diameter, stainless steel casing. Use threaded screw-type joints only. Flush thread all connections. Screen 15 feet in each well using two-inch diameter stainless steel casing with up to 0.010 inch slots. Well screening should extend ten feet into the aquifer and five feet above the water table to collect floating contaminants and allow for yearly fluctuations in the water table; however, this may not alway be possible due to site-specific groundwater conditions. Do not extend well screens to the ground surface, a minimum two foot bentonite or cement grout seal is required above all well screens, see paragraph 6.g. below. Cap the bottom of the screen. Well installation shall not exceed 1000 linear feet.

f. Should a confining layer below the saturated zone be encountered while attempting to drill deep enough to install 15 feet of

screen, grout the hole in the confining layer to prevent potential contaminant migration and screen the well above the confining layer.

g. Once the casing is installed, remove the augers and allow the soil formation to collapse around the well screen. Supplement the natural gravel pack with washed and bagged rounded sand or gravel with a grain size distribution compatible with the screen and formation. Place the gravel pack from the bottom of the borehole to two feet above the top of the screen. Tremie a granulated, pelletized, or slurry bentonite seal above the gravel/sand pack. Install the bentonite to a minimum thickness of two feet, and ensure a complete seal forms. Place Type I Portland cement grout from the bentonite seal to the land surface.

h. Complete the wells by extending the well casing a minimum of two feet above land surface. The height of the casing riser must take into account standing surface water depths during the wet season to prevent surface waters from cascading down the well casing. Provide an end-plug or casing cap for each well. Shield the extended stainless steel with a steel guard pipe which is placed over the casing and cap, and seated in a 16-inch by 16-inch by 4-inch concrete surface pad. Slope the pad away from the well casing. Install a lockable cap or lid on the steel guard pipe. Install three four-inch diameter steel guard posts if the base determines the well is in an area which needs such protection. The guard posts shall each be eight feet in total length and installed radially from each wellhead. Recess the guard posts approximately four feet into the ground and insure they are removable to facilitate access for sampling pump installation. Paint the protective steel pipe and clearly number the well on the sleeve exterior.

i. Determine by survey the elevation at the top of the casing of all newly installed monitor wells to an accuracy of 0.01 feet with respect to a base bench mark. Horizontally locate the new wells to an accuracy of 1.0 feet and record the position on both project and site specific maps. Bench marks must have previously been established from and are traceable to a USCGS/USGS survey marker.

j. Measure water levels at all monitor wells as feet below the ground surface or below the top of casing elevation to the nearest 0.01 feet. Report in terms of mean sea level. Measure static water levels in the wells prior to sampling and at well development. After the wells have recovered from water sample collection, measure water levels to confirm previous measurements.

7. Allow wells to stabilize after development for a minimum of 24 hours prior to sampling. Purge wells prior to sampling until a minimum of three well volumes of water have been displaced and the pH, temperature, specific conductance, color, and odor of the discharge have stablized. Use a stainless steel or teflon bailer, or air-lift pump to purge wells. Sample using a bottom-discharge Teflon bailer.

8. If the well(s) cannot be sampled due to well development, well characteristics, or other reason(s), indicate the reason(s) in the report specified in Item VI.

9. Collect and analyze one round of water samples from all groundwater monitor wells. During sample collection from all wells, examine the surface of the water table for the presence of hydrocarbons and, if applicable, measure the thickness of the hydrocarbon layer.

10. Soil Borings

a. Conduct 19 soil borings not to exceed a maximum of 250 linear feet. The average estimated boring depth is ten feet except where noted in Section B. Accomplish the borings using hollow-stem auger techniques. Obtain samples using ASTM Method D-1526.

b. During the boring operations, take samples at two and one-half foot intervals to develop lithographic descriptions and stratigraphic logs. Monitor the auger cuttings for signs of changing formations. Place special emphasis on field identification of contaminated soils encountered.

c. Scan all soil samples with a photoionization meter or equivalent organic vapor detector. Include monitoring results in the boring logs.

d. Whenever possible, measure water levels in all boreholes after the water level has stabilized.

e. Grout all boreholes to the surface. It is especially important to ensure that they be adequately resealed to preclude future migration of contaminants.

f. Permanently mark each location where soil borings are drilled. Record the location on a site specific map.

11. Collect pond sediment samples using a drop corer device or an Ekman dredge. Obtain surface soil samples using a stainless steel spoon or spade. Decontamination procedures outlined below are applicable.

12. Analyze water and soil samples collected as specified in Section B for those parameters summarized in Table 2. Laboratories conducting the analyses of samples must be certified as required by state or other regulatory agency standards as applicable in the State of Minnesota. The required detection limits and methods for these analyses are delineated in Table 4. Maintain all raw laboratory data for a minimum of five years after project completion and provide raw data to the USAFOEHL upon request.

13. Methods which employ gas chromatography (GC) as the analytical technique--EPA Methods 601, 602, 608, 615, 8010, 8020, 8080, 8150--require positive confirmation of identity for all analytes having concentrations higher than the Method Detection Limit (MDL). This positive confirmation shall be conducted by second-column GC; however, gas chromatography/mass spectroscopy (GC/MS) can be used for positive confirmation if the quantity of each analyte to be confirmed is above the detection level of the GC/MS instrument. Analytes which cannot be confirmed will be reported as "Not Detected" in the body of the report, but the results of all second-column GC or GC/MS confirmational analyses are to be included in the report appendix along with other raw analytical data. Quantification of confirmed analytes will be based upon the first column analysis. The maximum number of confirmational analyses that will be funded under this delivery order is fifty percent (50%) of actual field samples. The total number of samples for each GC method listed in Table 2 includes this allowance.

14. Analyze an additional 15% of all sample parameters for quality

control purposes. Field blanks must be an integral part of the quality control program. Provide all quality control sample analysis results in the report.

15. Plot and map all field data collected for each site according to surveyed positions. Identify or estimate the nature of contamination, its magnitude, and the potential for contaminant flow to receiving streams and ground water.

16. Remove all borehole cuttings and clean the general area following the completion of each well and boring. Properly containerize cuttings suspected of being contaminated (based on discoloration, odor or organic vapor detection instrument). Test the suspected contaminated waste for EP Toxicity and Ignitibility. The contractor shall be responsible for transporting drums containing suspected contaminated soils. The contractor shall be responsible for the ultimate disposal of contaminated soils in accordance with current Federal, State, and/or local hazardous waste disposal laws. The contractor shall provide a final, completed copy of the hazardous waste manifest document to the HQ TAC/SGPB point of contact referenced in paragraph V for those borehole cuttings obtained from TAC sites (Sites 1, 5, 6, 7, and 9) and to the ANGSC/SGB point of contact referenced in paragraph V for those borehole cuttings obtained from ANG sites (Sites 2, 3, 4, 8, and 10).

17. Decontaminate all sampling and well purging equipment prior to use and between samples to avoid cross contamination. As a minimum, wash equipment with a laboratory-grade detergent followed by a distilled water rinse, repeating the rinsing procedure two more times. Where field conditions warrant, follow the laboratory-grade detergent wash with a hexane rinse, rinse with distilled water, and finally wash with dilute nitric acid and rinse again with distilled water. Allow sufficient time for the solvent to evaporate and for the equipment to dry completely. The calibrated water level indicator for measuring well volume and fluid elevation must be decontaminated before use in each well.

18. Thoroughly clean and decontaminate the drilling rig and tools before initial use and after each borehole completion. As a minimum, steam clean drill bits after each borehole is installed. Drill from the <u>least</u> to the <u>most</u> contaminated areas, if possible.

19. Evaluate available techniques for well abandonment that are applicable to the type of monitor wells and geological conditions at Duluth IAP. Consider that these wells will be abandoned at some future date after the study objectives have been met and they are no longer needed. Recommend a candidate abandonment method or technique, including costs. Ensure abandonment techniques comply with state and local rules. The actual process of well abandonment is not part of this study.

20. Perform an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.

21. Conduct a literature search of local hydrogeologic conditions to complement the Phase I and Phase II Reports. Use this data to determine optimum well locations. Include the pertinent literature search information in Appendix D of the Final Report. Develop the literature search data using the following guideline:

a. Topographic data

b. Geologic data

(1) Structure
(2) Stratigraphy
(3) Lithology

c. Hydrologic data

(1) Location of existing wells, observation holes and springs within a one-mile radius of sites to be investigated.

(2) Groundwater table and piezometric contours

(3) Depth to water

(4) Quality of water

d. Data on existing wells, observation holes, and springs withi a one-mile radius of sites to be investigated.

(1) Location, depth, diameter, types of wells, and construction logs

(2) Static and pumping water level, hydrographs, yield, specific capacity, and quality of water

(3) Present and projected groundwater development and anticipated use

(4) Corrosion, incrustation, well interference, and similar operation and maintenance problems

(5) Location, type, geologic setting, and hydrographs of springs

(6) Observation well networks

(7) Existing water sampling sites

e. Aquifer data

(1) Type, such as unconfined, artesian, or perched

(2) Thickness, depth, and formation designation

(3) Boundaries

(4) Transmissivity, storativity, and permeability

(5) Specific retention

(6) Discharge and recharge

(7) Ground and surface water relationships

(8) Aquifer models

f. Climatic data

(1) Precipitation

(2) Evapotranspiration

B. In addition to the general items delineated in A above, conduct the following specific actions at the sites identified in Table 1 and Figure 1 (required analytical parameters are listed in Table 2):

1. <u>Site 1 (TAC) - Goose Dump 1(D-1)</u>

a. Drill and construct a maximum of four monitor wells. Position three of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. To collect ambient water quality information, place the fourth well outside the site perimeter consistent with the assumed upgradient direction of groundwater flow. Collect one groundwater sample from each monitor well. During the borehole drilling collect a maximum of four soil samples for laboratory analysis, see I.A.6.c.

b. Drill one soil boring in the suspected zone of contaminatio and collect soil samples from the ground surface and at each two and one-hal foot interval until the estimated final borehole depth of ten feet is reache . Analyze the samples from the surface and at the two and one-half and five foot depths.

c. Designate two sampling points from surface waters located a the site, or from surface waters adjacent to and downstream of the site.

d. Collect both a water sample and a bottom sediment sample from each of these surface water sample points.

e. Analyze all water and soil samples for volatile organic a aromatic compounds (VOA), oil and grease (O&G), pesticides/herbicides (P/H), polychlorinated biphenyls (PCBs), phenols and metals.

2. <u>Site 2 (ANG) - Fire Training Areas 1 and 2 (FT-1 and FT-2)</u>

a. Drill and construct a maximum of five monitor wells. Position one well consistent with the assumed upgradient direction of groundwater flow. Use information from this well to establish ambient water quality. Place four wells in the assumed downgradient direction of groundwater flow; two between FT-1 and FT-2 on either side of the access road and two north of FT-2. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of five soil samples for laboratory analysis, see I.A.6.c.

b. Drill two soil borings in FT-1 and one soil boring in FT-2. Locate each boring in the center of a burn pit. If the second and older burn pit in FT-1 cannot be defined through aerial photographs or a physical site inspection, only drill one boring in FT-1. Collect soil samples from the ground surface and at each two and one-half foot interval until the estimated final borehole depth of ten feet is reached. Analyze the samples from the ground surface and the two and one-half and five foot depths.

c. Designate sampling points in the drainageway between the western extension of the access road and the southwestern boundry of site FT-2. Collect two surface water samples and two bottom sediment samples from this drainageway.

d. Collect one surface sediment sample and one surface water

sample from the swamp to the north and downgradient of FT-2.

e. Collect one round of groundwater samples from the six existing monitor wells at these sites.

f. Analyze all water and soil samples for VOA, O&G and phenols.

3. Site 3 (ANG) - DPDO Storage Area "C" (S-2)

a. Drill and construct a maximum of four monitor wells. The positioning, and soil and water sampling follows that specified at Site 1, para B.1.a.

b. Drill three soil borings positioned along a center-line running north to south in the storage area. Follow the soil sampling plan specified at Site 1, para B.1.b.

c. Designate sampling points in the drainageway which begins on the east side of the storage area and then heads in a northwesterly direction. Collect three surface water samples and three bottom sediment samples from this drainageway. Collect the first sediment and water sample in the approximate location of Sample 2 identified in the Stage 1 study. Subsequent sample points should be at 100 foot intervals downgradient along the drainageway.

d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

4. Site 4 (ANG) - Tank Farm Area (SP-1)

a. Perform a geophysical survey using a metal detector and a magnetometer to precisely locate underground pipes. Perform an electromagnetic survey to identify leak sites from these pipes. Survey the entire tank farm to include a minimum 50 foot buffer around the site perimeter. Expand the geophysical survey on the southern side of the tank farm area to the main acces road. A former fueling facility is located south of the tank farm.

b. Drill and construct a maximum of four monitor wells. The well positioning, and soil and water sampling follows that specified at Site 1, para B.1.a.

c. Drill five soil borings, position them based upon the geophysical survey result and the data generated during the Stage 1 study. Boring depth is estimated to be 15 feet; however, drill until the water table is reached. Collect soil samples at two and one-half foot intervals beginning at ground surface. Analyze the samples collected at two and one-half, five, and seven and one-half foot depths.

d. Designate sample points in the drainageways/culverts around the site, of particular interest is the drainageway heading north to Beaver Creek. Collect four surface water and four sediment samples from the drainageways/culverts.

e. Collect one round of groundwater samples from the four existing monitor wells at this site.

f. Analyze all water and soil samples for VOA and O&G.

5. Site 5 (TAC) - South Goose Dump (D-4)

a. This site was originally designated D-4, South Goose Missle Site Dump, in the Phase I report and was not recommended for Phase II Stage 1 evaluation. However, during Phase II Stage 1, it was erroneously confused with D-1, Goose Missle Site Dump, which was recommended for Phase II Stage 1 monitoring. Consequently, this site was studied during the Phase II Stage 1 effort, but referenced as site D-1 throughout the report.

b. Drill and construct three monitor wells. Position two of the wells approximatley 50 feet from the site perimeter and consistent with the assumed downgradient direction of groundwater flow. Place the other monitor well outside the site perimeter and consistent with the assumed upgradient direction of groundwater flow so as to collect ambient water quality information. Collect one groundwater sample from each monitor well. During the borehole drilling, collect a maximum of three soil samples for laboratory analysis, see I.A.6.c.

c. Collect three surface water samples from the pond/swamp at this site.

d. Collect a maximum of five sediment samples from the bottom of the pond/swamp area and drainageways which exit this site.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

6. Site 6 (TAC) - Goose Dump 2 (D-2)

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the dump site drums. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot locate the drums and accurately define the site location, perform no more wo

c. If the site can be located, drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at two and one-half feet for ethylene glycol, O&G and VOA.

7. Site 7 (TAC) - Runway 13 NE Disposal (D-6)

a. Perform a geophysical survey using a metal detector and magnetometer to define as accurately as possible the site boundaries. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.

c. Drill two exploratory soil borings in the zone of contamination. Collect soil samples from the ground surface and at two and one-half foot intervals until the estimated final borehole depth of ten feet is reached. Analyze the samples from the surface and at the two and one-half foot depth.

d. If surface drainage from the site can be located, collect

one each bottom sediment and surface water sample outside, but within 20 feet, of the site boundry.

e. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

8. Site 8 (ANG) - Old DPDO Storage Area (S-1)

a. Drill and construct three monitor wells. The positioning, and soil and water sampling follows that specified at Site 5, B.5.b.

b. Drill two exploratory soil borings, one in the center of each of the two former storage area sites. The soil sampling plan follows that specified at Site 1, B.1.b.

c. Collect two surface water and two bottom sediment samples from drainageways at points downstream of the site.

d. Analyze all water and soil samples for VOA, O&G, P/H, PCBs, phenols and metals.

9. Site 9 (TAC) - Disposal Pit (D-9)

a. Perform a geophysical survey using a metal detector and a magnetometer to locate the site. Also conduct a detailed examination of available aerial photographs for the same purpose.

b. If the geophysical survey and aerial photographs cannot accurately define the site location, perform no more work.

c. If the site can be located, drill one exploratory soil boring in the zone of contamination. Collect soil samples at two and one-half foot intervals and analyze the samples at two and one-half feet above and below the water table.

d. If the site can be located, drill and construct one monitor well at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Collect one groundwater sample.

e. Analyze all water and soil samples for acetone and picric acid.

10. Site 10 (ANG) - Low-Level Radioactive Waste Disposal (RD-1)

a. Conduct a geophysical survey (metal detector and magnetometer) and review aerial photographs to accurately locate the site.

b. Drill and construct three monitor wells. Position two of the wells at the site perimeter consistent with the assumed downgradient direction of groundwater flow. Place the third well in the assumed upgradient direction of groundwater flow to collect ambient water quality information. Do not analyze soil samples from these boreholes.

c. Collect one groundwater sample from each well and analyze them for gross alpha, gross beta, radium - 226 and radium - 228.

C. Field Coordination

Notify the Air Force POC's (see section V) at the USAFOEHL and Duluth IAP at least five days in advance of water sample collection dates.

D. Technical Field Operations Plan

Develop a detailed field operations plan based upon the technical requirements specified in this task description for the proposed work effort. Be explicit with regards to field procedures. Include, but do not limit the plan to, field decontamination operations, sampling protocol, QA/QC field procedures, field schedule, etc. A guideline for the plan is provided under separate cover. Reference paragraph VI, Sequence No. 2.

E. Health and Safety

Comply with all applicable USAF, OSHA, EPA, state and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of personnal protection at study sites. Prepare a written Health and Safety Plan for the proposed work effort and coordinate it directly with regulatory agencies where required. Provide an information copy of the Health and Safety Plan to the USAFOEHL prior to commencing field operations (i.e., drilling and sampling). (Reference paragraph VI, Sequence No. 7)

F. Data Review

1. Tabulate field and analytical laboratory results (including quality control data), and incorporate them into the monthly R&D Status Reports. Forward them to the USAFOEHL for review as soon as they become available as specified in Item VI below. In addition to the results, report the dates of sample collection, extraction (if applicable) and analysis.

2. Upon completion of all analyses, tabulate and incorporate all results into an Informal Technical Information Report (Atch 1, Seq 3 as specified in the contract and in Item VI below) and forward the report to the USAFOEHL for review.

3. Immediately report to the USAFOEHL Program Manager via telephone, data/results generated during this investigation which indicate a potential health risk (for example, a contaminated drinking water aquifer).

G. Reporting

1. Prepare two draft reports following the USAFOEHL-supplied report format (mailed under separate cover). One report shall delineate the findings for the TAC sites (Sites 1, 5, 6, 7, and 9). The second report shall detail the findings at the ANG sites (Sites 2, 3, 4, 8, and 10). Forward the reports to the USAFOEHL (as specified in item VI below) for Air Force review and comment.

2. Review the results, conclusions and recommendations from previous IRP investigations which concern the sites listed in this task. Integrate all investigative work done at each site to date so the report reflects the total available information for each site. Use this cumulative information and data to establish trends and develop conclusions and recommendations.

3. Include in this report a discussion of regional/site-specific hydrogeology, well and borings logs, data from water level surveys, groundwater surface and gradient maps, and avalable hydrogeologic cross sections and geophysical survey data.

4. In the results section, include water and soil analysis results, field quality control sample data (field blanks, duplicates, etc.), internal laboratory quality control data (lab blands, lab spikes, and lab duplicates), and laboratory quality assurance information. Provide second-column confirmation results and include which columns were used, the conditions existing and retention times.

5. Make estimates of the magnitude, extent and direction in which detected contaminants are moving. Identify potential environmental consequences of discovered contamination based upon State and/or Federal standards.

6. Summarize the specific collection techniques, analytical method holding time and limit of detection used for each analyte (Standard Methods, EPA, ASTM, etc.).

7. In the recommendation section, address each site and list them by category. Category I consists of sites where no further action, including remedial action, is required. Data for these sites are considered sufficient to rule out unacceptable health or environmental risks. Category II sites are those requiring additional investigation to quantify or further assess the extent of current or future contamination. Category III denotes sites that will require remedial action (ready for IRP Phase IV). In the recommendations for Category III sites, include any possible influence on sites in Categories I and/or II due to their connection to the same hydrological system. Clearly state any dependency between sites in different categories. Include a list of candidate remedial action alternatives, including Long Term Monitoring (LTM) as remedial action, and the corresponding rationale that should be considered in selecting the remedial action for a given site. List all alternatives that could potentially bring the site into compliance with environmental standards. For contaminants that do not have standards, EPA recommended safe levels for non-carcinogens (Health Advisory or Suggested-No-Adverse-Response Levels) and target levels for carcinogens (1×10^{-6} cancer risk level) may be used. If not specifically requested, do not include a comprehensive cost or technical analyses of alternatives. However, in those situations where field survey data indicate immediate corrective action is necessary, present specific, detailed recommendations. For each category above, summarize the results of field data, environmental or regulatory criteria, or other pertinent information supporting conclusions and recommendations.

8. For those sites needing additional Phase II study, identify specific requirements, if any, for future monitoring. Identify potential environmental consequences of contamination. Provide estimates of costs by line items for additional investigations beyond this stage along with estimates of time required to accomplish the investigation. Furnish the cost data in a separately bound appendix to the final report. (Reference paragraph VI, Sequence No. 2)

9. Provide an inventory of all on-base wells, to include production, irrigation, abandoned, monitoring, etc.

10. Include in an appendix to the report the names of all local, state or other regulatory personnel and the dates they approved well

drilling, development and purging techniques, well materials, and sampling methods. All well drilling, development, purging, and sampling must conform to State and local regulatory agency requirements.

11. Provide the candidate well abandonment techniques and the recommended techniques most appropriate for Duluth IAP.

H. Meetings

The contractors project leader shall attend two meetings to take place at a time to be specified by the USAF OEHL. Each meeting shall take place at Duluth IAP for a duration of one day (eight hours).

II. SITE LOCATION AND DATES

Duluth IAP MN
Date to be established

III. BASE SUPPORT

A. Prior to any contractor digging or drilling, locate underground utilities and issue digging permits.

B. Provide access to the Phase II Stage 1 monitoring wells.

C. Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, etc., as needed to evaluate sites under investigation.

D. The base Point Of Contact shall receive from the contractor the split samples, select 10% of them, package them, and then deliver them back to the contractor within 24 hours for subsequent overnight shipment to USAFOEHL/SA as stated in paragraph I.A.5.

E. Provide contractor with a secure staging area for storing equipment and supplies.

F. Provide a paved area where drilling equipment can be cleaned and decontaminated.

G. Base Civil Engineer will prepare and sign any hazardous waste manifest documentation resulting from this effort.

H. Base will store any drums containing suspected hazardous waste until determined to be hazardous/non-hazardous.

IV. GOVERNMENT FURNISHED PROPERTY: None

V. GOVERNMENT POINTS OF CONTACT:

1. 2Lt Gary Woodrum
USAFOEHL/TSS
Brooks AFB TX 78235-5501
AV 240-2158
(512) 536-2158
1-800-821-4528

2. Col Jerry Dougherty
HQ TAC/SGPB
Langley AFB, VA 23665-5001
AV 432-5857
(804) 764-2180

GRAGE

3. Lt Col Michael Washeleski
ANGSC/SGB
Andrews AFB, MD 20331-6008
AV 858-3443/5926
(301) 981-5926

4. Sgt Suzanne ~~Schlies~~
148 TAC Clinic
Duluth IAP MN 55811-5000
AV 825-7223
(218) 723-7224

VI. In addition to sequence numbers 1, 5 and 11 listed in Attachment 1 to the contract, and which apply to all orders, the sequence numbers listed below are applicable to this order. Also shown are dates applicable to this order.

Seq. No.	Para. No.	Block 10	Block 11	Block 12	Block 13	Block 14
~~2~~ 19	I.D. Techn. Op. Plan.	O/TIME	86 OCT 10	86 OCT 13		15
7	I.E.	O/TIME	86 OCT 10	86 OCT 13		3
3	I.F.1.	O/TIME	*	*		3
4	I.G.(TAC)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	**
4	I.G.(ANG)	ONE/R	86 DEC 31	87 JAN 16	87 OCT 16	**
2	I.G.8.	O/TIME	87 Jan 16	87 OCT 16		***
14		MONTHLY	86 OCT 27	86 NOV 11		
15		MONTHLY	86 OCT 27	86 NOV 11		

* Upon completion of the analytical effort and prior to submission of the first draft report.

** Two draft reports and one final report are required. Incorporate Air Force comments into the second draft and final report as specified by the USAF OEHL. Supply the USAFOEHL with a single copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute all report copies as specified by the USAFOEHL. Supply 25 copies of each draft report and 50 copies plus the original camera ready copy of the final report. Distribute the remaining 24 copies of each draft report and 49 copies of the final report as specified by the USAFOEHL.

*** Submit cost estimates (five copies) in a separately bound document with the final report only. Provide estimates for only those sites recommended for additional Phase II work (Category II) or Phase IV, long-term monitoring (Category III).

TABLE 2

SAMPLING AND ANALYTICAL REQUIREMENTS

DULUTH IAP

Analyte	Medium	Site Numbers 1	2	3	4	5	6	7	8	9	10	QA (9)	2nd Column Confirmation (10)	TOTAL
VOA (1)	Water (7)	6	14	7	12	6	-	4	5	-	-	9	30	93
	Soil (8)	9	17	16	23	8	4	8	11	-	-	15	53	164
Oil & Grease (2)	Water	6	14	7	12	6	-	4	5	-	-	9	-	63
	Soil	9	17	16	23	8	4	8	11	-	-	15	-	111
Metals (3)	Water	6	-	7	-	6	-	4	5	-	-	5	-	33
	Soil	9	-	16	-	8	-	8	11	-	-	9	-	61
Pesticides/ Herbicides (4)	Water	6	-	7	-	6	-	4	5	-	-	5	16	49
	Soil	9	-	16	-	8	-	8	11	-	-	9	29	90
PCB	Water	6	-	7	-	6	-	4	5	-	-	5	16	49
	Soil	9	-	16	-	8	-	8	11	-	-	9	29	90
Phenol	Water	6	14	7	-	6	-	4	5	-	-	8	-	50
	Soil	9	17	16	-	8	-	8	11	-	-	11	-	80
Acetone	Water	-	-	-	-	-	-	-	-	1	-	1	-	2
	Soil	-	-	-	-	-	-	-	-	2	-	1	-	3
Picric Acid	Water	-	-	-	-	-	-	-	-	1	-	1	-	2
	Soil	-	-	-	-	-	-	-	-	2	-	1	-	3
Ethylene Glycol	Soil	-	-	-	-	-	4	-	-	-	-	1	-	5
Radiation (5)	Water	-	-	-	-	-	-	-	-	-	3	1	-	4
EP Toxicity Metals (6)	Soil Cuttings	15	samples authorized as needed - not specified by site									2	-	17
EP Ignitibility	Soil Cuttings	15	samples authorized as needed - not specified by site									2	-	17

NOTES: (See following page)

TABLE 2 (Continued)

NOTES:
(1) See Table 3.

(2) Use Method 3550 to extract oil and grease from soil.

(3) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver

(4) See Table 5.

(5) Includes analysis for Gross Alpha, Gross Beta, Radium-226 and Radium-228.

(6) Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver

(7) Includes both well and surface water samples.

(8) Includes both borehole and sediment samples.

(9) QA is 15% of the basic sample load.

(10) Assumes 50% for Methods 601, 602, 608, 615, 8010, 8020, 8080 and 8150 will require second column confirmation.

TABLE 3

VOLATILE ORGANIC COMPOUNDS (VOA)

PURGEABLE HALOCARBONS
EPA Methods 601 and SW 8010

Bromodichloromethane
Bromoform
Bromomethane
Carbon tetrachloride
Chlorobenzene
Chloroethane
2-Chloroethylvinyl ether
Chloroform
Chloromethane
Dibromochloromethane
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloropropane
1,3-Dichloropropene
trans-1,3-Dichloropropene
Methylene chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

PURGEABLE AROMATICS
EPA Methods 602 and SW 8020

Benzene
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene

Also: Xylene

TABLE 4

ANALYTICAL PARAMETERS, METHODS AND REQUIRED DETECTION LIMITS

PARAMETER	METHOD	DETECTION LIMIT
Oil and Grease (Using IR)	EPA 413.2	20 µg/g soil [a] 1 mg/l water
Volatile Organic and Aromatic Compounds (VOA)	EPA 601 and 602 SW 8010 and 8020	b b
EP Toxicity	b	c
Ignitibility	SW 1010	d
Pesticides and/or PCB	EPA 608 SW 3550 and 8080	e 1 µg/g soil
Herbicides	EPA 615 SW 8150	e 1 µg/g soil
Phenol	EPA 420.2	5 µg/l water 5 µg/g soil
Metals		
Arsenic [f]	EPA 206.2 SW 3050 and 706	10 µg/l water 1 µg/g soil
Barium [f]	EPA 208.2 SW 3050 and 6010	200 µg/l water 20 µg/g soil
Cadmium [f]	EPA 213.2 SW 3050 and 6010	10 µg/l water 1 µg/g soil
Chromium [f]	EPA 218.1 SW 3050 and 6010	50 µg/l water 5 µg/g soil
Lead [f]	EPA 239.2 SW 3050 and 6010	20 µg/l water 2 µg/g soil
Mercury [f]	EPA 245.1 SW 7471	1.0 µg/l water 0.1 µg/g soil
Selenium [f]	EPA 270.3 SW 3050 and 7740	10 µg/l water 1 µg/g soil
Silver [f]	EPA 272.2 SW 3050 and 6010	10 µg/l water 1 µg/g soil

TABEL 4 (Continued)

PARAMETER	METHOD	DETECTION LIMIT
Acetone	ASTM D 3695-82	-
Picric Acid	USATHAMA 2B	-
Ethylene Glycol	NIOSH P & CAM 338 Modified for Soil	-
Gross Alpha	Standard Methods: 15th ed, 703	-
Gross Beta	Standard Methods: 15th ed, 703	-
Radium-226	EPA 600/4-80-032, 903.0	-
Radium-228	EPA 600/4-80-032, 904.0	

TABLE 4 (Continued)

[a]Based on extracting 50 grams of soil and 100 ml final extract volume.

[b]Detection limits for Purgeable Organics and Aromatics shall be as specified for the compounds by EPA Methods 601-602. Method: Federal Register, Vol. 44, including these items:

Item 1.4 - This method is recommended by EPA for use only by experienced residue analysts or under the close supervision of such qualified persons.

Item 2.2 - This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary chromatographic column that will be helpful in resolving the compounds of interest from interferences. This must be done in the case of vinyl chloride and so noted in the analysis report.

Items 3.3, 7.1-7.3 - These sections must be analyzed within the recommended holding times.

Item 8.3 - All samples must be analyzed within the recommended holding times. This must be followed without exception.

If questions are encountered about certain contaminants, you may be asked to show both chromatograms used to rule out possible interferences.

[c]

Metals	µg/l of Extract
As	0.053
Ba	0.1
Cd	0.005
Cr	0.05
Pb	0.1
Hg	0.0002
Se	0.075
Ag	0.01

[d]Find if sample is ignitable at 140 degrees Fahrenheit or below. If so, it is a hazardous waste.

[e]Method Detection Limit

[f]Primary Drinking Water Standard, 40 CFR 141.11

TABLE 5

Pesticides and PCBs - EPA Methods 608 and SW 8080

aldrin
dieldrin
chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
a-endosulfan
b-endosulfan
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide

a-BHS
b-BHC
g-BHC
w-BHC
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016
toxaphene

Herbicides - EPA Method 615 and SW 8150

2,4-D
2,4,5-T
2,4,5-TP (Silvex)